SYLVA
SYLVARUM

BACON

1639

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Francis Lord Verulam
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Ca White
To Gurney H. Burton
Sept 29th 1900

Would be glad
to receive this book
and be kept for him.

Hon.mo Francisco Bacon. Baro de Verulam. Vice-Comes Sti Albani. Mortuus 9 Aprilis, Anno Dni. 1626. Annoq; Aetat. 66.

SYLVA SYLVARVM
or
A NATVRALL HISTORY
In ten Centuries.

Written by the right Honble Francis Lo: Verulam Viscount S^ct Alban.

Published after ye Author^rs Death by W: RAWLEY D^r of Diuinity. &c

LONDON
Printed for W: Lee and are to be sould at the Great Turks head next to the Mytre Taurne in Fleetstreet

Anno 1627

SYLVA SYLVARVM:

OR, Pryse Campbell Ardersier

A Naturall Historie.

IN TEN CENTVRIES.

VVRITTEN BY THE RIGHT *Honourable* FRANCIS LO. *Verulam* Viscount St ALBAN.

Published after the Authors death,

BY WILLIAM RAVVLEY *Doctor in Divinity, one of his Majesties Chaplaines.*

Hereunto is now added an Alphabeticall Table of the principall things contained in the whole Worke.

The fifth Edition.

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TO THE MOST HIGH AND MIGHTY PRINCE CHARLES,

BY THE GRACE OF GOD, King of *Great Britaine, France,* and *Ireland,* Defender of the Faith, &c.

May it pleaſe your moſt Excellent Majeſtie;

THe whole Body of the *Naturall Hiſtory*, either deſigned or written, by the late *Lord Viſcount S. Alban*, was dedicated to your *Majeſtie*, in his Booke *De Ventis*, about foure yeares paſt, when your *Majeſtie* was *Prince:* So as there needed no new Dedication of this *Worke*, but onely in all humbleneſſe, to let your *Majeſtie* know, it is yours. It is true; if that *Lord* had lived, your *Majeſtie*, ere long, had beene invoked, to the Protection of another *Hiſtory*; whereof, not *Natures Kingdome*, as in this, but theſe of your *Majeſties*,

(during the Time and *Raigne* of *King Henry* the *Eighth*) had beene the Subiect: Which since it died under the Designation meerely, there is nothing left, but your *Majesties* Princely Goodnesse, graciously to accept of the Vndertakers Heart, and Intentions; who was willing to have parted, for a vvhile, vvith his Darling *Philosophie*, that he might have attended your Royall Commandement, in that other *Worke*. Thus much I have beene bold, in all lowlinesse, to represent unto your *Majestie*, as one that vvas trusted vvith his *Lordships Writings*, even to the last. And as this *Worke* affecteth the *Stampe* of your *Majesties Royall Protection*, to make it more currant to the *World*; So under the *Protection* of this *Worke*, I presume in all humblenesse to approach your *Majesties* presence; And to offer it up into your *Sacred Hands*.

Your MAIESTIES most Loyall

and Devoted Subject,

VV. RAVVLEY.

To the Reader.

HAving had the Honour to be continually with my *Lord*, in compiling of this *Worke*; And to be employed therein; I have thought it not amisse, (with his Lordships good leave and liking,) for the better satisfaction of those that shall reade it, to make knowne somewhat of his Lordships Intentions, touching the Ordering, and Publishing of the same. I have heard his Lordship often say; that if he should have served the glory of his own Name, he had been better not to have published this *Naturall History*: For it may seeme an Indigested Heap of Particulars; And cannot have that Lustre, which Bookes cast into Methods have: But that he resolved to preferre the good of Men, and that which might best secure it, before any thing that might have Relation to Himselfe. And he knew well, that there was no other vway open, to unloose Mens mindes, being bound; and (as it were) Maleficiate, by the Charmes of deceiving Notions, and Theories; and thereby made Impotent for Generation of Workes; But onely no where to depart from the Sense, and cleare experience; But to keepe close to it, especially in the beginning: Besides, this *Naturall History* was a Debt of his, being designed and set down for a third part of the *Instauration*. I have also heard his Lordship discourse, that Men (no doubt) will thinke many of the *Experiments* contained in this Collection, to be Vulgar and Triviall: Meane and Sordid; Curious and Fruitlesse: And therefore he wisheth, that they would have perpetually before their Eyes, what is now in doing: And the difference between this *Naturall Historie*, and others. For those *Naturall Histories*; which are Extant, being gathered for De-

 light

light and Use, are full of pleasant Descriptions and Pictures; and affect and seeke after Admiration, Rarities, and Secrets. But contrariwise, the Scope which his Lordship intendeth, is to write such a *Naturall Historie*, as may be Fundamentall to the Erecting and Building of a true *Philosophy*: For the Illumination of the *Understanding*; the Extracting of *Axiomes*; and the producing of many Noble *Workes*, and *Effects*. For he hopeth by this meanes, to acquit himselfe of that, for which he taketh *Himselfe* in a sort bound; And that is the Advancement of all Learning and Sciences. For having in this present Worke Collected the Materials for the Building; And in his *Novum Organum* (of which his Lordship is yet to publish a Second Part) set downe the Instruments and Directions for the Work; Men shall now bee wanting to themselves, if they raise not Knowledge to that perfection, whereof the Nature of Mortall Men is capable. And in this behalfe, I have heard his Lo. speake complainingly; That his Lordship (who thinketh that he deserveth to be an Architect in this building) should be forced to be a Work-man, and a Labourer; And to digge the Clay, and burne the Brick; And more than that, (according to the hard Condition of the *Israelites* at the latter end) to gather the Straw and Stubble, over all the Fields, to burne the Bricks withall. For he knoweth, that except he doe it, nothing will be done: Men are so set to despise the meanes of their owne good. And as for the *Basenesse* of many of the Experiments; As long as they be Gods Works, they are honourable enough. And for the *Vulgarnes* of them; true *Axiomes* must be drawne from plaine Experience, and not from doubtfull, And his Lordships course is to make Wonders Plaine, and not Plaine things Wonders; And that Experience likewise must be broken and grinded, and not whole, or as it groweth. And for *Vse*, his Lordship hath often in his Mouth, the two kindes of *Experiments*; *Experimenta Fructifera*, and *Experimenta Lucifera*: *Experiments of Vse*, and *Experiments of Light*: And he reporteth himselfe, whether he vvere not a strange Man, that should thinke that *Light* hath no Use, because it hath no Matter. Further his Lordship thought good also, to adde unto many of the *Experiments* themselves, some *Glosse* of the *Causes*; that in the succeeding vworke of *Interpreting Nature*, and *Framing Axiomes*, all things may bee in more readinesse. And for the *Causes* herein by Him assigned; his Lordship persvvadeth Himselfe, they are farre more certaine, than

those

thoſe that are rendred by Others; Not for any Excellency of his owne Wit, (as his Lordſhip is wont to ſay) but in reſpect of his continuall Converſation with *Nature*; and *Experience*. He did conſider likewiſe, that by this addition of *Cauſes*, mens mindes (which make ſo much haſte to finde out the *Cauſes* of things;) would not thinke themſelves utterly loſt, in a vaſt wood of *Experience*, but ſtay upon theſe *Cauſes*, (ſuch as they are, a little, till true *Axiomes* may be more fully diſcovered. I have heard his Lordſhip ſay alſo, that one great reaſon, why he would not put theſe Particulars into any exact *Method*, (though he that looketh attentively into them, ſhall finde that they have a ſecret Order) was becauſe he conceived that other men would now thinke that they could doe the like; And ſo go on with a further Collection: which if the *Method* had been Exact, many would have deſpaired to attaine by Imitation. As for his Lordſhips love of Order, I can referre any Man to his Lordſhips Latine Booke, *De Augmentis Scientiarum*; which (if my Judgement be any thing) is written in the Exacteſt Order, that I know any VVriting to be. I will conclude with an uſuall ſpeech of his Lordſhips. That this VVorke of his *Naturall Hiſtorie*, is the *World*, as GOD made it, and not as Men have made it; For that it hath nothing of Imagination.

This Epiſtle is the ſame, that ſhould have beene prefixed to this Booke, if his Lordſhip had lived.

W. Rawley.

those that are rendred by Others; Not for any Excellency of his owne Wit, (as his Lordship is wont to say) but in regard of his continuall Conversation with Nature, and Experience. He did consider likewise, that by this addition of Energy, mens minds (which make so much haste to finde out the Energy of things;) would not think themselves meerly lost, in a vast wood or Wilderness, but stay upon these Rules, (such as they are, a little, till true Answer may be more fully discovered. I have heard his Lordship say also, that one great reason, why he would not put these Particulars into any exact Method, (though he that looketh attentively into them, shall finde that they have a secret Order) was because he conceived that other men would now think that they could doe the like; And so go on with a further Collection: which if the Method had been Exact, many would have desired to attaine by imitation. As for his Lordships Love of Order, I can refere any Man to his Lordships Latine Booke, De Augmentis Scientiarum, which (if my Judgement be any thing) is written in the Exactest Order, that I know, any Writing to be. I will conclude with an usuall Speech of his Lordships. That this Worke of his Naturall History, is the Worke, as GOD made it; and not as Men have made it; For that it hath nothing of Imagination.

This Epistle is the same, that should have been prefixed to this Booke, if the Lordship had lived.

A TABLE OF the Experiments.

Century I.

Century II.

Century III.

Of

Century IV.

Century V.

Century VI.

Century VII.

Of

Century VIII.

Of

Century IX.

Of

Of

Century X.

NATU-

NATVRALL HISTORIE.

I. Century.

DIgge a *Pit* upon the *Sea shore*, somewhat above the High-water Marke, and sinke it as deepe as the Low-water Marke; And as the *Tide* commeth in, it will fill with *Water*, Fresh and Potable. This is commonly practized upon the Coast of *Barbary*, where other fresh *Water* is wanting. And *Cæsar* knew this well, when he was besieged in *Alexandria*: For by digging of *Pits* in the *Sea shore*, hee did frustrate the Laborious Workes of the Enemies, which had turned the *Sea-Water* upon the Wels of *Alexandria*; And so saved his Army, being then in Desperation. But *Cæsar* mistooke the Cause, For hee thought that all *Sea-Sands* had Naturall Springs of *Fresh Water*. But it is plaine, that it is the *Sea-water*; because the Pit filleth according to the Measure of the *Tide*: And the *Sea-water* passing or Strayning through the Sands, leaveth the Saltnesse.

Experiments in *Consort*, touching the Straining and Passing of Bodies, one through another: which they call *Percolation*.

1

I remember to have Read, that Tryall hath beene made of *Salt-water* passed through *Earth*; through Ten Vessels, one within another, and yet it hath not lost his Saltnesse, as to become potable: But the same Man saith, that (by the Relation of Another) *Salt-water* drayned through twenty Vessels, hath become Fresh. This *Experiment* seemeth to crosse that other of *Pits*, made by the *Sea-side*; and yet but in part, if it be true, that twenty Repetitions doe the Effect. But it is worth the Note, how poore the Imitations of Nature are, in common course of *Experiments*, except they bee led by great Judgement, and some good Light of *Axiomes*. For first, there is no small difference betweene a Passage of *Water* through twenty small Vessels; And through such a distance, as betweene the Low-water and High-water Mark. Secondly, there is a great difference betweene Earth and Sand. For all Earth hath in it a kinde of Nitrous Salt, from which Sand is more free: And besides, Earth doth not straine the Water so finely, as Sand doth. But there is a third Point, that I suspect as much, or more than the other Two; And that is, that in the *Experiment* of *Transmission* of the *Sea-water* into the *Pits*, the *Water* riseth; But in the *Experiment* of Transmission of the *Water* through the Vessels, it falleth: Now certain it is, that the Salter Part of *Water*, (once

2

Salted throughout) goeth to the Bottome. And therefore no marvaile, if the Drayning of *Water* by descent, doth not make it fresh: Besides, I doe somewhat doubt, that the very Dashing of the *Water*, that commeth from the Sea, is more proper to strike off the Salt part, than where the *Water* slideth of her owne Motion.

3 It seemeth *Percolation* or *Transmission*, (which is commonly called *Straining*,) is a good kinde of *Separation*, Not onely of Thicke from Thin, and Grosse from Fine; But of more subtile Natures; And varieth according to the Body through which the *Transmission* is made. As if through a woollen Bagg, the Liquour leaveth the Fatnesse; If through Sand, the Saltnesse; &c. They speake of Severing Wine from Water, passing it through Ivy wood, or through other the like porous Body; But *Non constat*.

4 The *Gumm* of *Trees* (which we see to bee commonly shining and cleare) is but a fine Passage or *Straining* of the Juyce of the Tree, through the Wood and Barke. And in like manner, *Cornish Diamonds*, and *Rock Rubies*, (which are yet more resplendent than *Gumms*) are the fine Exudations of *Stone*.

5 *Aristotle* giveth the Cause, vainly, why the *Feathers* of *Birds* are of more lively Colours, than the *Haires* of *Beasts*; for no *Beast* hath any fine Azure, or Carnation, or Greene *Haire*. He saith, It is, because *Birds* are more in the Beames of the Sunne, than *Beasts*; but that is manifestly untrue; For *Cattle* are more in the Sunne than *Birds*, that live commonly in the Woods, or in some Covert. The true Cause is, that the Excrementitious Moisture of living Creatures, which maketh as well the *Feathers* in *Birds*, as the *Haire* in *Beasts*, passeth in *Birds* through a finer and more delicate Strainer, than it doth in *Beasts*: For *Feathers* passe through Quills; And *Haire* through Skin.

6 The *Clarifying* of *Liquors* by Adhesion, is an Inward *Percolation*; And is effected, when some Cleaving Body is Mixed and Agitated with the *Liquors*; whereby the grosser Part of the *Liquor* sticks to that Cleaving Body; And so the finer Parts are freed from the Grosser. So the *Apothecaries* clarifie their *Sirrups* by whites of Eggs, beaten with the Juices which they would clarifie; which whites of Eggs gather all the Dregs and grosser Parts of the Juice to them; And after the *Sirrup* being set on the Fire, the whites of Egges themselves harden, and are taken forth. So *Ippocrasse* is clarified by mixing with Milke; And stirring it about, And then passing it through a Woollen Bagg, which they call *Hippocrates Sleeve*, And the Cleaving Nature of the Milke draweth the Powder of the Spices, and grosser parts of the *Liquor* to it; and in the passage they stick upon the Woollen bagge.

7 The *Clarifying* of *Water*, is an *Experiment* tending to Health; besides the pleasure of the Eye, when *Water* is Chrystaline. It is effected by casting in and placing Pebbles, at the Head of a Current; that the *Water* may straine through them.

8 It may be, *Percolation* doth not onely cause Clearenesse and Splendour, but Sweetnesse of Savour; For that also followeth, as well as Clearnesse, when the Finer Parts are severed from the Grosser. So it is found, that the Sweats of Men that have much Heat, and exercise much, and have cleane Bodies, and fine Skinnes, doe smell sweet; As was said of *Alexander*; And we see, commonly, that *Gumms* have sweet Odours.

Experiments in Consort touching *Motion* of *Bodies* upon their *Pressure*.

9 TAke a *Glasse*, and put *Water* into it, and wet your Finger, and draw it round about the Lip of the Glasse, pressing it somewhat hard; And after you have drawne it some few times about, it will make the Water friske and

and sprinkle up, in a fine Dew. This *Instance* doth excellently Demonstrate the Force of *Compression* in a Solid Bodie. For whensoever a Solid Body (as Wood, Stone, Metall, &c.) is pressed, there is an inward Tumult in the parts thereof; seeking to deliver themselves from the Compression: And this is the Cause of all *Violent Motion*. Wherein it is strange in the highest Degree, that this *Motion* hath never beene observed, nor inquired; It being of all *Motions*, the most Common, and the Chiefe Root of all *Mechanicall Operations*. This *Motion* worketh in round at first, by way of Proofe, and Search, which way to deliver it selfe; And then worketh in Progresse, where it findeth the Deliverance easiest. In *Liquors* this *Motion* is visible: For all Liquors strucken make round Circles, and withall Dash; but in *Solids*, (which breake not,) it is so subtile, as it is invisible; but nevertheleſſe bewrayeth it selfe by many effects; as in this *Instance* whereof we speake. For the *Pressure* of the Finger furthered by the wetting (because it sticketh so much the better unto the Lip of the *Glasse*,) after some continuance, putteth all the small Parts of the *Glasse* into worke; that they strike the *Water* sharply; from which *Percussion* that Sprinkling commeth.

If you strike or pierce a *Solid Body*, that is Brittle, as *Glasse*, or *Suger*, it breaketh not onely, where the immediate force is; but breaketh all about into shivers and fitters; The *Motion*, upon the *Pressure*, searching all wayes; and breaking where it findeth the *Body* weakest. 10

The *Powder* in *Shot*, being Dilated into such a *Flame*, as endureth not *compression*; Moveth likewise in round, (The *Flame* being in the Nature of a *Liquid Body*:) Sometimes recoyling; Sometimes breaking the *Piece*; But generally discharging the *Bullet*, because there it findeth easiest Deliverance. 11

This *Motion* upon *Pressure*, and the Reciprocall thereof, which is *Motion* upon *Tensure*; wee use to call (by one common Name) *Motion of Libertie*; which is, when any *Body*, being forced to a *Preter-Naturall* Extent, or Dimension, deliveretb and restoreth it selfe to the Naturall: As when a *Blowne Bladder* (Pressed) riseth againe; or when *Leather* or *Cloth* tentured spring backe. These two *Motions* (of which there bee infinite Instances,) we shall handle in due place. 12

This *Motion* upon *Pressure* is excellently also demonstrated in *Sounds*; As when one Chimeth upon a *Bell*, it soundeth; But as soone as he layeth his hand upon it, the *Sound* ceaseth: And so, the *Sound* of a *Virginall String*, as soone as the Quill of the Jack falleth from it, stoppeth. For these *Sounds* are produced, by the subtile Percussion of the Minute parts, of the *Bell*, or *String*, upon the Aire; All one, as the *Water* is caused to leape by the subtile Percussion of the Minute parts of the *Glasse*, upon the Water, whereof we spake a little before in the ninth *Experiment*. For you must not take it to be, the locall *Shaking* of the *Bell*, or *String*, that doth it. As wee shall fully declare, when we come hereafter to handle *Sounds*. 13

Experiments in Consort touching *Separations* of *Bodies by Weight*. 14

TAke a *Glasse* with a *Belly* and a long *Neb*; fill the *Belly* (in part) with *Water*: Take also another *Glasse*, whereinto put *Claret Wine* and *Water* mingled; Reverse the first *Glasse*, with the *Belly* upwards, Stopping the *Nebb* with your finger; Then dip the Mouth of it within the Second *Glasse*, and remove your Finger: Continue it in that posture for a time; And it will unmingle the *Wine* from the *Water*: The *Wine* ascending and settling in the top of the upper *Glasse*; And the *Water* descending and settling in the bottome of the lower *Glasse*. The passage is apparent to the Eye; For

you shall see the *Wine*, as it were, in a small veine, rising through the *Water*. For handsomnesse sake (because the Working requireth some small time) it were good you hang the upper *Glasse* upon a Naile. But as soone as there is gathered so much pure and unmixed *water* in the Bottome of the Lower *Glasse*, as that the Mouth of the upper *Glasse* dippeth into it, the *Motion* ceaseth.

15 Let the Upper *Glasse* be *Wine*, and the Lower *Water*; there followeth no *Motion* at all. Let the Upper *Glasse* be *Water* pure, the Lower *Water* coloured; or contrariwise; there followeth no *Motion* at all. But it hath been tryed, that though the Mixture of *Wine* and *Water*, in the Lower *Glasse*, bee three parts *Water*, and but one *Wine*; yet it doth not dead the *Motion*. This *Separation* of *Water* and *Wine* appeareth to bee made by *Weight*; for it must be of *Bodies* of unequall *Weight*, or else it worketh not; And the Heavier *Body* must ever bee in the upper *Glasse*. But then note withall, that the *Water* being made pensile, and there being a great *Weight* of *Water* in the *Belly* of the *Glasse*, sustained by a small Piller of *Water* in the Neck of the *Glasse*; It is that, which setteth the *Motion* on worke: For *Water* and *Wine* in one *Glasse*, with long standing, will hardly sever.

16 This *Experiment* would be Extended from Mixtures of severall *Liquours*, to *Simple Bodies*, which Consist of severall Similare Parts: Try it therefore with *Broyne* or *Salt water*, and *Fresh water*: Placing the *Salt water* (which is the heavier) in the upper *Glasse*; And see whether the *Fresh* will come above. Trie it also with *Water thick Sugred*, and *Pure water*; and see whether the *water* which commeth above, will lose his Sweetnesse: For which purpose it were good there were a little Cock made in the Belly of the upper *Glasse*.

Experiments in Consort touching *Iudicious* and *Accurate Infusions*, both in *Liquors*, and *Aire*.

IN *Bodies* containing Fine Spirits, which doe easily dissipate, when you make *Iufusions*, the Rule is; A short Stay of the *Body* in the *Liquour* receiveth the Spirit; And a longer Stay confoundeth it; because it draweth forth the Earthy Part withall; which embaseth the finer. And therefore it is an Errour in *Physitians*, to rest simply upon the Length of stay, for increasing the vertue. But if you will have the *Infusion* strong, in those kind of *Bodies*, which have fine Spirits, your way is, not to give Longer time, but to repeat the *Infusion* of the *Body* oftner. Take *Violets*, and infuse a good Pugill of them in a Quart of Vineger; Let them stay three quarters of an houre, and take them forth; And refresh the *Infusion* with like quantity of new *Violets*, seven times; And it will make a Vineger so fresh of the *Flower*, as if a Twelve-moneth after, it be brought you in a Saucer, you shall smell it before it come at you. Note, that it smelleth more perfectly of the Flower, a good while after, than at first.

17

18 This Rule, which we have given, is of singular use, for the Preparations of *Medicines*, and other *Infusions*. As for Example; the Leafe of *Burrage* hath an Excellent Spirit, to represse the fuliginous Vapour of Dusky Melancholy, and so to cure Madnesse: But nevertheless, if the Leafe bee infused long, it yeeldeth forth but a raw substance, of no Vertue: Therefore I suppose, that if in the Must of Wine, or Wort of Beere, while it worketh, before it bee Tunned, the *Burrage* stay a small time, and bee often changed with fresh; It will make a Soveraigne Drinke for Melancholy Passions. And the like I conceive of *Orenge Flowers*.

19 *Rubarb* hath manifestly in it Parts of cōtrary Operations: Parts that purge; And parts that binde the body: And the first lay looser, and the latter lay deeper:

deeper: So that if you infuſe *Rubarb* for an houre, and cruſh it well, it will purge better, and binde the Body leſſe after the purging, than if it ſtood twenty foure houres; This is tryed: But I conceive likewiſe, that by Repeating the *Infuſion* of *Rubarb*, ſeverall times, (as was ſaid of Violets,) letting each ſtay in but a ſmall time; you may make it as ſtrong a *Purging Medicine*, as *Scammony*. And it is not a ſmall thing wonne in *Phyſick*, if you can make *Rubarb*, and other *Medicines* that are *Benedict*, as ſtrong Purgers, as thoſe that are not without ſome Malignity.

Purging Medicines, for the moſt part, have their *Purgative* Vertue, in a fine Spirit; As appeareth by that they endure not boyling, without much loſſe of vertue. And therefore it is of good uſe in *Phyſick*, if you can retaine the *Purging* Vertue, and take away the Unpleaſant taſte of the *Purger*; which it is like you may doe, by this Courſe of *Infuſing* oft, with little ſtay. For it is probable, that the Horrible and Odious Taſte, is in the Groſſer part. 20

Generally, the working by *Infuſions*, is groſſe and blinde, except you firſt trie the Iſſuing of the ſeverall Parts of the Bodie, which of them Iſſue more ſpeedily, and which more ſlowly; And ſo by apportioning the time, can take and leave that Quality, which you deſire. This to know, there be two wayes; The one to trie what long ſtay, and what ſhort ſtay worketh, as hath beene ſaid: The other to trie in Order, the ſucceeding *Infuſions*, of one and the ſame Bodie, ſucceſſively, in ſeverall *Liquours*. As for example; Take *Orenge-Pils*, or *Roſe-Mary*, or *Cinnamon*, or what you will; And let them *Infuſe* halfe an houre in *Water*: Then take them out; and *Infuſe* them againe in other *Water*; And ſo the third time: And then taſte and conſider the *firſt Water*, the *Second*, and the *Third*: And you will find them differing, not only in Strength and Weakneſſe, but otherwiſe in Taſte, or Odour; For it may be the *Firſt water* will have more of the Sent, as more Fragrant; And the *Second* more of the Taſte, as more bitter or Biting, &c. 21

Infuſions in *Aire*, (for ſo we may well call *Odours*) have the ſame diverſities with *Infuſions* in *Water*; In that the ſeverall *Odours* (which are in one Flower, or other Body) iſſue at ſeverall times; Some earlier, ſome later: So wee finde that *Violets*, *Woodbines*, *Strawberries*, yeeld a pleaſing Sent, that commeth forth firſt; But ſoone after an ill Sent quite differing from the Former. Which is cauſed, not ſo much by Mellowing, as by the late Iſſuing of the Groſſer Spirit. 22

As we may deſire to extract the fineſt Spirits in ſome Caſes; So we may deſire alſo to diſcharge them (as hurtfull) in ſome other. So *Wine burnt*, by reaſon of the Evaporating of the finer Spirit, enflameth leſſe, and is beſt in Agues: *Opium* leeſeth ſome of his poyſonous Qualitie, if it be vapoured out, mingled with *Spirit* of *Wine*, or the like: *Sean* leeſeth ſomewhat of his windineſſe by Decocting; And (generally) ſubtile or windy Spirits are taken off by Incenſion, or Evaporation. And even in *Infuſions* in things that are of too high a Spirit, you were better powre off the firſt *Infuſion*, after a ſmall time, and uſe the latter. 23

Experiment Solitary touching the *Appetite* of *Continuation in Liquids*.

B*ubbles* are in the forme of an *Hemiſphere*; *Aire* within, and a little Skin of *Water* without: And it ſeemeth ſomewhat ſtrange, that the *Aire* ſhould riſe ſo ſwiftly, while it is in the *Water*; And when it commeth to the top, ſhould be ſtayed by ſo weake a Cover as that of the *Bubble* is. But as for the ſwift Aſcent of the *Aire*, while it is under the *Water*, that is a *Motion* of *Percuſſion* from the *Water*; which it ſelfe deſcending, driveth up the Aire; and no *Motion* of *Levity* in the *Aire*. And this *Democritus* 24

 called

called *Motus Plagæ*. In this Common *Experiment*, the Cause of the Enclosure of the *Bubble* is, for that the Appetite to resist Separation, or Discontinuance, (which in solide *Bodies* is strong) is also in *Liquours*, though fainter and weaker; As wee see in this of the *Bubble*: we see it also in little Glasses of Spittle that children make of Rushes; And in Castles of Bubbles, which they make by blowing into *water*, having obtained a little Degree of Tenacity by Mixture of Soape: Wee see it also in the *Stillicides* of *water*, which if there be *water* enough to follow, will Draw themselves into a small thred, because they will not discontinue; But if there be no Remedy, then they cast themselves into round Drops; which is the Figure, that saveth the Body most from Discontinuance: The same Reason is of the Roundnesse of the *Bubble*, as well for the Skin of *Water*, as for the *Aire* within: For the *Aire* likewise avoideth *Discontinuance*; And therefore casteth it selfe into a round Figure. And for the stopp and Arrest of the *Aire* a little while, it sheweth that the *Aire* of it selfe hath little, or no Appetite, of Ascending.

Experiment Solitary touching the making of *Artificiall Springs*.

25

THE Rejection, which I continually use, of *Experiments*, (though it appeareth not) is infinite; But yet if an *Experiment* be probable in the Worke, and of great Use, I receive it, but deliver it as doubtfull. It was reported by a Sober Man, that an *Artificiall Spring* may be made thus: Finde out a hanging Ground, where there is a good quick Fall of Rain-water. Lay a Halfe-Trough of Stone, of a good length, three or four foot deepe within the same Ground; with one end upon the high Ground, the other upon the low. Cover the Trough with Brakes a good thicknesse, and cast Sand upon the Top of the Brakes: You shall see, (saith hee) that after some showres are past, the lower end of the Trough will runne like a *Spring* of *water*: which is no marvaile, if it hold, while the Raine-water lasteth; But hee said it would continue long time after the Raine is past: As if the water did multiply it selfe upon the Aire, by the helpe of the Coldnesse and Condensation of the Earth, and the Consort of the first Water.

Experiment Solitary touching the *Venomous Quality* of *Mans Flesh*.

26

THE *French*, (which put off the Name of the *French Disease*, unto the Name of the *Disease* of *Naples*,) doe report, that at the Siege of *Naples*, there were certaine wicked Merchants that Barrelled up *Mans flesh*, (of some that had been lately slain in *Barbary*) and sold it for *Tunney*; And that upon that foule and high Nourishment, was the Originall of that *Disease*. Which may well bee; For that it is certaine, that the *Caniballs* in the *West Indies*, eat *Mans flesh*; And the *West Indies* were full of the Pocks when they were first discovered: And at this day the *Mortalest poisons*, practised by the *West Indians*, have some Mixture of the Bloud, or Fat, or Flesh of *Man*: And divers Witches, and Sorceresses, as well amongst the *Heathen*, as amongst the *Christians*, have fed upon *Mans flesh*, to aid (as it seemeth) their Imagination, with high and foule Vapours.

Experiment Solitary touching the *Version* and *Transmutation* of *Aire* into *water*.

27

IT seemeth that there bee these wayes (in likelihood) of *Version* of *Vapours* or *Aire*, into *Water* and *Moisture*. The first is *Cold*; which doth manifestly Condense; as wee see in the *Contracting of the Aire* in the *Weather-Glasse*; whereby it is a Degree nearer to *Water*. We see it also in the *Generation of Springs*, which the *Antients* thought (very probably) to be made by the *Version* of *Aire* into *Water*, holpen by the *Rest*, which the *Aire* hath in those Parts; whereby it cannot dissipate. And by the *Coldnesse* of *Rocks*; for there

there *Springs* are chiefly generated. We see it also in the Effects of the *Cold* of the *Middle Region* (as they call it) of the *Aire*; which produceth *Dewes*, and *Raines*. And the Experiment of Turning *water* into *Ice*, by Snow, Nitre, and Salt, (whereof we shall speak hereafter,) would be transferred to the Turning of *Aire* into *Water*. The Second way is by *Compression*; As in *Stillatories*, where the Vapour is turned back, upon it selfe, by the Encounter of the Sides of the *Stillatory*; And in the *Dew* upon the Covers of *Boyling Pots*. And in the *Dew* towards *Raine*, upon *Marble*, and *Wainscot*. But this is like to doe no great effect; Except it be upon Vapours, and grosse *Aire*, that are already very neare in Degree to Water. The Third is that, which may bee searched into, but doth not yet appeare; which is, by *Mingling* of *moist Vapours* with *Aire*; And trying if they will not bring a Returne of more *water*, than the *Water* was at first: For if so; That Increase is a *Version* of the *Aire*: Therefore put water into the Bottome of a *Stillatory*, with the Neb stopped; Weigh the *Water* first; Hang in the Middle of the *Stillatory* a large *Spunge*; And see what Quantity of *Water* you can crush out of it; And what it is more, or lesse, compared with the *water* spent; For you must understand, that if any *Version* can be wrought, it will be easilieſt done in small Pores: And that is the Reason why we prescribe a *Spunge*. The Fourth way is Probable also, though not Appearing; Which is, by *Receiving the Aire* into the small *Pores of Bodies*; For (as hath beene said) every thing in small Quantity is more easie for *version*; And Tangible Bodies have no pleasure in the consort of *Aire*, but endevour to subact it into a more *Dense Body*: But in *Entire Bodies* it is checked; because if the *Aire* should Condense, there is nothing to succeed: Therefore it must be in *loose Bodies*, as *Sand*, and *Powder*; which we see, if they lie close, of themselves gather Moisture.

Experiment Solitary touching *Helps* towards the *Beauty* and *good Features* of *Persons*.

28

IT is reported by some of the *Ancients*; That *Whelps*, or other *Creatures*, if they be put Young, into such a Cage, or Box, as they cannot rise to their Stature, but may increase in Breadth, or length, will grow accordingly, as they can get Roome: which if it be true, and faisible, and that the young *Creature* so pressed, and straightened, doth not thereupon die, It is a Meanes to produce *Dwarfe Creatures*, and in a very Strange figure. This is certaine, and noted long since; That the Pressure or Forming of Parts of Creatures, when they are very young, doth alter the Shape not a little; As the Stroaking of the Heads of Infants, between the Hands, was noted of Old, to make *Macrocephali*; which shape of the Head, at that time, was esteemed. And the Raising gently of the Bridge of the Nose, doth prevent the Deformity of a Saddle Nose. Which observation well weighed, may teach a Meanes, to make the Persons of Men, and Women, in many kindes, more comely, and better featured, than otherwise they would bee; By the Forming and Shaping of them in their Infancy: As by Stroaking up the Calves of the Legges, to keep them from falling downe too low; And by Stroaking up the Forehead to keepe them from being low-foreheaded. And it is a common Practice to swathe Infants, that they may grow more straight, and better shaped: And we see Young Women, by wearing straight Bodies, keepe themselves from being Grosse and Corpulent.

Experiment Solitary touching the *Condensing* of *Aire* in such sort as it may put on *Weight*, and yeeld *Nourishment*.

29

ONions, as they hang, will many of them shoot forth; and so will *Pennyroiall*; and so will an Herbe called *Orpin*; with which they use, in the Countrey, to trimme their Houses, binding it to a Lath, or Stick, and setting it against a wall. We see it likewise, more especially, in the greater

Semper-

Semper-vive, which will put out Branches, two or three yeares : But it is true, that commonly they wrap the Root in a Cloth besmeared with *Oyle*, and renue it once in halfe a Yeare. The like is reported by some of the *Ancients*, of the *Stalks of Lillies*. The Cause is; For that these *Plants* have a Strong, Dense, and Succulent Moisture, which is not apt to exhale; And so is able, from the old store, without drawing helpe from the Earth, to suffice the sprouting of the *Plant*: And this Sprouting is chiefly in the late Spring, or early Sommer; which are the Times of Putting forth. Wee see also, that *Stumps* of *Trees*, lying out of the ground, will put forth Sprouts for a Time. But it is a Noble Triall, and of very great Consequence, to try whether these things, in the Sprouting, doe increase *Weight*; which must bee tryed, by weighing them before they be hang'd up; And afterwards againe, when they are sprouted. For if they increase not in *Weight*; Then it is no more but this; That what they send forth in the Sprout, they leese in some other Part: But if they gather *Weight*, then it is *Magnale Naturæ*; For it sheweth that *Aire* may be made so to be Condensed, as to be converted into a *Dense Body*; whereas the Race and Period of all things, here above the Earth, is to extenuate and turne things to be more *Pneumaticall*, and Rare; And not to be Retrograde, from *Pneumaticall* to that which is *Dense*. It sheweth also, that *Aire* can *Nourish*; which is another great Matter of Consequence. Note, that to trie this, the *Experiment* of the *Semper-vive*, must be made without Oyling the Cloth; For else, it may bee, the *Plant* receiveth Nourishment from the Oyle.

Experiment Solitary touching the *Commixture* of *Flame* and *Aire*, and the *great Force* thereof.

30

Flame and *Aire* doe not Mingle, except it be in an *Instant*; Or in the *vitall Spirits* of *vegetables*, and *living Creatures*. In *Gunpowder*, the Force of it hath beene ascribed, to Rarefaction of the Earthy Substance into *Flame*; And thus farre it is true: And then (forsooth) it is become another Element; the Forme whereof occupieth more place; And so, of Necessitie, followeth a Dilatation: And therefore, left two Bodies should bee in one place, there must needs also follow an Expulsion of the Pellet; Or blowing up of the Mine. But these are Crude and Ignorant Speculations. For *Flame*, if there were nothing else, except it were in very great quantity, will be suffocate with any hard Body, such as a Pellet is; Or the Barrell of a Gunn; So as the *Flame* would not expell the hard Body; But the hard Body would kill the *Flame*, and not suffer it to kindle, or spread. But the Cause of this so potent a Motion, is the *Nitre*, (which we call otherwise *Salt-Petre*;) which having in it a notable Crude and windy *Spirit*, first by the *Heat* of the *Fire* suddenly dilateth it selfe; (And we know that simple *Aire*, being preternaturally attenuated by *Heat*, will make it selfe Roome, and breake, and blow up that which resisteth it;) And Secondly, when the *Nitre* hath dilated it selfe, it bloweth abroad the *Flame*, as an inward Bellowes. And therefore we see that *Brimstone*, *Pitch*, *Camphire*, *Wilde-Fire*, & divers other Inflammable Matters, though they burne cruelly, and are hard to quench, Yet they make no such fiery winde, as *Gunpowder* doth: And on the other side, we see that *Quick-Silver*, (which is a most Crude and Watry *Body*) heated, and pent in, hath the like force with *Gunpowder*. As for *living Creatures*, it is certaine, their *Vitall Spirits* are a Substance Compounded of an *Airy* and *Flamy* Matter; And though *Aire* and *Flame* being free, will not well mingle; yet bound in by a *Body* that hath some fixing, they will. For that you may best see in those two Bodies, (which are their *Aliments*,) *Water*, and *Oyle*; For they likewise will not well mingle of themselves, but in the Bodies of *Plants*, and

and *Living Creatures*, they will. It is no marvaile therefore, that a ſmall *Quantity* of *Spirits*, in the Cels of the Braine, and Cannals of the Sinewes, are able to move the whole Body, (which is of ſo great Maſſe,) both with ſo great Force, as in Wreſtling, Leaping; And with ſo great Swiftneſſe, as in playing Diviſion upon the *Lute*. Such is the force of theſe two Natures, *Aire* and *Flame*, when they incorporate.

Experiment Solitary touching the *Secret Nature* of *Flame*.

31

TAke a ſmall *Wax Candle*, and put it in a Socket, of Braſſe, or Iron; Then ſet it upright in a Porringer full of *Spirit of Wine*, heated: Then ſet both the *Candle*, and *Spirit of Wine*, on fire, and you ſhall ſee the *Flame* of the *Candle*, open it ſelfe, and become foure or five times bigger than otherwiſe it would have beene; and appeare in Figure *Globular*, and not in *Piramis*. You ſhall ſee alſo, that the Inward *Flame* of the *Candle* keepeth Colour, and doth not wax any whit blew towards the Colour of the Outward *flame* of the *Spirit of Wine*. This is a Noble *Inſtance*; wherein two things are moſt remarkable; The one; that one *Flame* within another quencheth not; but is a fixed Body, and continueth as *Aire*, or *Water* doe. And therefore *Flame* would ſtill aſcend upwards in one greatneſſe, if it were not quenched on the *Sides*: And the greater the *Flame* is at the Bottome, the higher is the Riſe. The other, that *Flame* doth not mingle with *Flame*, as *Aire* doth with *Aire*, or *Water* with *Water*, but onely remaineth contiguous; As it commeth to paſſe betwixt Conſiſting Bodies. It appeareth alſo, that the forme of a Piramis in *Flame*, which we uſually ſee, is meerely by Accident, and that the *Aire* about, by quenching the Sides of the *Flame*, cruſheth it, and extenuateth it into that Forme; For of it ſelfe it would be Round: And therefore *Smoake* is in the Figure of a Piramis Reverſed; For the *Aire* quencheth the *Flame*, and receiveth the *Smoake*. Note alſo, that the *Flame* of the *Candle*, within the *Flame* of the *Spirit of Wine*, is troubled; And doth not only open and move upwards, but moveth waving, and to and fro: As if *Flame* of his owne Nature (if it were not quenched,) would rowle and turne, as well as move upwards. By all which it ſhould ſeeme, that the Cœleſtiall Bodies, (moſt of them,) are true *Fires* or *Flames*, as the *Stoicks* held; More fine (perhaps) and Rarified, than our *Flame* is. For they are all Globular, and Determinate; They have Rotation; And they have the Colour and Splendour of *Flame*: So that *Flame* above is Durable, and Conſiſtent, and in his Naturall place; But with us, it is a Stranger, and Momentany, and Impure; Like *Vulcan* that halted with his Fall.

Experiment Solitary touching the *Different force* of *Flame* in the *Middeſt* and on the *Sides*.

32

TAke an *Arrow*, and hold it in *Flame*, for the ſpace of ten pulſes; And when it commeth forth, you ſhall finde thoſe Parts of the *Arrow*, which were on the Outſides of the *Flame*, more burned, blacked, and turned almoſt into a Coale; whereas that in the Middeſt of the *Flame*, will be, as if the Fire had ſcarce touched it. This is an *Inſtance* of great conſequence for the diſcovery of the Nature of *Flame*; And ſheweth manifeſtly, that *Flame* burneth more violently towards the Sides, than in the Middeſt: And, which is more, that *Heat* or *Fire* is not violent or furious, but where it is checked and pent. And therefore the *Peripateticks* (howſoever their opinion of an *Element* of *Fire* above the *Aire* is juſtly exploded;) in that Point they acquit themſelves well: For being oppoſed, that if there were a *Spheare* of *Fire*, that incompaſſed the Earth ſo neare hand, it were impoſſible but all things ſhould be burnt up; They anſwer, that the pure *Elementall Fire*, in his owne place, and not irritate, is but of a Moderate *Heat*.

It

Experiment Solitary touching the *Decrease* of the *Naturall motion* of *Gravity* in *great distance from the Earth*; or *within some depth of the Earth.* 33

IT is affirmed constantly by many, as an usuall Experiment; That a *Lump* of *Vre*, in the *Bottome* of a Mine, will be tumbled, and stirred, by two Mens strength; which if you bring it to the *Top* of the *Earth*, will aske Six Mens strength at the least to stirre it. It is a Noble *Instance*, and is fit to be tryed to the full: For it is very probable, that the *Motion of Gravitie* worketh weakly, both farre from the Earth, and also within the Earth: The former, because the Appetite of Union of Dense Bodies with the Earth, in respect of the distance, is more dull; The latter, because the Body hath in part attained his Nature, when it is some Depth in the Earth. For as for the Moving to a *Point* or Place (which was the Opinion of the *Ancient*) it is a meere Vanity.

Experiment Solitary touching the *Contraction* of *Bodies* in *Bulk*, by the *Mixture* of the more *Liquid Body* with the more *Solid* 34

IT is strange, how the *Ancients* tooke up *Experiments* upon credit, and yet did build great Matters upon them. The Observation of some of the best of them, delivered confidently is, That a *Vessell* filled with *Ashes*, will receive the like quantity of *Water*, that it would have done, if it had beene empty. But this is utterly untrue, for the *Water* will not goe in by a Fifth part. And I suppose, that that Fifth part is the difference of the lying close, or open, of the *Ashes*; As wee see that *Ashes* alone, if they be hard pressed, will lie in lesse room: And so the *Ashes* with *Aire* between, lie looser; and with *Water*, closer. For I have not yet found certainly, that the *Water*, it selfe, by mixture of *Ashes*, or *Dust*, will shrinke or draw into lesse Roome.

Experiment Solitary touching the *Making Vines* more *fruitfull.* 35

IT is reported of credit, that if you lay good store of *Kernels* of *Grapes*, about the *Root* of a *Vine*; it will make the *Vine* come earlier and prosper better. It may be tryed with other *Kernels*, laid about the *Root* of a *Plant* of the same kinde; As *Figgs*, *Kernels* of *Apples*, &c. The Cause may be, for that the *Kernels* draw out of the Earth Juice fit to nourish the *Tree*, as those that would be *Trees* of themselves, though there were no *Root*; But the *Root* being of greater strength, robbeth and devoureth the Nourishment, when they have drawne it: As great *Fishes* devoure little.

Experiments in Consort touching *Purging Medicines.* 36

THe *Operation* of *Purging Medicines*, and the Causes thereof, have beene thought to be a great Secret; And so according to the slothfull manner of Men, it is referred to a *Hidden Propriety*, a *Specificall vertue*, and a *Fourth Quality*, & the like Shifts of Ignorance. The *Causes* of *Purging* are divers; all plain and perspicuous; and throughly maintained by Experiēce. The first is, That whatsoever cannot be overcome and disgested by the *Stomack*, is by the *Stomack*, either put up by *Vomit*, or put down to the *Gutts*; And by that *Motion* of *Expulsion* in the *Stomack*, & *Guts*, other *Parts of the Bodie*, (as the *Orifices* of the *Veins*, & the like) are moved to expell by *Consent*. For nothing is more frequent than *Motion of Consent* in the Body of Man. This Surcharge of the *Stomack*, is caused either by the *Quality* of the *Medicine*, or by the *Quantity*. The *Qualities* are three: *Extreme Bitter*, as in *Aloës*, *Coloquintida*, &c. *Loathsome* and of horrible taste; As in *Agarick*, *Black Hellebore*, &c. And of *secret Malignity*, & disagreement towards *Mans Body*, many times not appearing much in the Taste; As in *Scammony*, *Mechoacham*, *Antimony*, &c. And note well, that if there be any *Medicine* that *Purgeth*, and hath neither of the first two *Manifest Qualities*; it is to bee held suspected, as a kinde of *Poyson*; For that it worketh either by *Corrosion*; or by a *secret Malignity*, and Enmity to *Nature*: And therefore such *Medicines* are warily to be prepared, and used. The *Quantity* of that which is taken, doth also cause *Purging*; As we see in a great *Quantitie* of *New Milke* from the Cow; yea and a great *Quantitie of Meat*; For

Surfets

Surfets many times turne to *Purges*, both upwards, and downwards. Therefore we ſee generally, that the working of *Purging Medicines* commeth two or three houres after the *Medicines* taken; For that the *Stomack* firſt maketh a proofe, whether it can concoct them. And the like happeneth after *Surfets*; Or *Milke* in too great *Quantity*.

A ſecond *Cauſe* is *Mordication* of the *Orifices* of the *Parts*; Eſpecially of the *Meſentery veines*; As it is ſeene, that *Salt*, or any ſuch thing that is ſharp and biting, put into the Fundament, doth provoke the Part to expell; And *Muſtard* provoketh Sneezing: And any ſharp Thing to the Eyes provoketh Teares. And therfore we ſee that almoſt all *Purgers* have a kinde of *Twiching* and *vellication*, beſides the *Griping* which commeth of winde. And if this *mordication* be in an over-high Degree, it is little better than the *Corroſion* of *Poyſon*; And it commeth to paſſe ſometimes in *Antimony*; Eſpecially if it be given to bodies not repleat with Humours; for where Humours abound, the Humours ſave the Parts. 37

The third *Cauſe* is *Attraction*: For I doe not deny, but that *Purging Medicines* have in them a direct Force of *Attraction*; As *Drawing Plaiſters* have in *Surgery*: And wee ſee *Sage*, or *Bettony bruſed*, *Sneezing-powder*, and other *Powders* or *Liquours* (which the *Phyſitians* call *Errhines*,) put into the Noſe, draw Flegme, and water from the Head; And ſo it is in *Apophlegmatiſmes*, and *Gargariſmes*, that draw the Rheume downe by the Pallat. And by this Vertue, no doubt, ſome *Purgers* draw more one Humour, and ſome another, according to the opinion received: As *Rubarb* draweth Choller; *Sean* Melancholy; *Agarick* Flegme; &c. But yet, (more or leſſe) they draw promiſcuouſly. And note alſo, that beſides Sympathy, between the *Purger* and the *Humour*, there is alſo another Cauſe, why ſome *Medicines* draw ſome Humour more than another. And it is, for that ſome *Medicines* worke quicker than others: And they that draw quick, draw onely the Lighter, and more fluide Humours; they that draw ſlow, worke upon the more Tough, and Viſcous Humours. And therefore Men muſt beware, how they take *Rubarb*, and the like, alone, familiarly; For it taketh onely the Lighteſt part of the Humour away, and leaveth the Maſſe of Humours more obſtinate. And the like may be ſaid of *Worme-wood*, which is ſo much magnified. 38

The fourth *Cauſe* is *Flatuoſitie*; For wine ſtirred moveth to expell: And wee finde that (in effect) all *Purgers* have in them a raw *Spirit*, or *Winde*; which is the Principall *Cauſe* of *Tortion* in the *Stomach*, and *Belly*. And therefore *Purgers* leeſe (moſt of them) the vertue, by Decoction upon the Fire; And for that Cauſe are given chiefly in Infuſion, Juyce, or Powder. 39

The fift *Cauſe* is *Compreſſion*, or *Cruſhing*: As when *Water* is Cruſhed out of a *Spunge*: So wee ſee that *Taking Cold* moveth looſeneſſe by Contracti- of the ſkin, and outward Parts; And ſo doth *Cold* likewiſe cauſe Rheumes, and Defluxions from the Head; And ſome *Aſtringent Plaſters* cruſh out purulent Matter. This kinde of Operation is not found in many *Medicines*: *Mirabolanes* have it; And it may be the *Barkes of Peaches*; For this Vertue requireth an *Aſtriction*; but ſuch an *Aſtriction*, as is not grateſull to the Body; (For a pleaſing *Aſtriction* doth rather Binde in the Humours, than Expell them:) And therefore ſuch *Aſtriction* is found in Things of an Harriſh Taſte. 40

The Sixth *Cauſe* is *Lubrefaction*, and *Relaxation*. As wee ſee in *Medicines Emollient*; Such as are *Milke*, *Honey*, *Mallowes*, *Lettuce*, *Mercuriall*, *Pellitory of the Wall*, and others. There is alſo a ſecret Vertue of *Relaxation* in *Cold*: For the *Heat* of the Body bindeth the Parts and Humours together, which 41

Cold,

Cold, relaxeth: As it is seene in *Vrine*, *Bloud*, *Pottage*, or the like; which, if they be *Cold*, Breake, and dissolve. And by this kinde of *Relaxation*, *Feare* looseneth the Belly; because the Heat retiring inwards towards the Heart, the Gutts and other Parts are relaxed; In the same manner as *Feare* also causeth Trembling in the Sinewes. And of this Kinde of *Purgers* are some *Medicines* made of *Mercury*.

42 The Seventh *Cause* is *Absterſion*; which is plainly a *Scouring off*, or *Incision* of the *more viscous Humours*, and making the *Humours* more fluide; And Cutting betweene them, and the Part. As is found in *Nitrous Water*, which scoureth Linnen Cloth (speedily) from the Foulenesse. But this *Incision* must bee by a *Sharpnesse*, without *Astriction*: Which we finde in *Salt*, *Wormewood*, *Oxymel*, and the like.

43. There be *Medicines*, that move *Stooles*, and not *Vrine*; Some other, *Vrine*, and not *Stooles*. Those that *Purge by Stoole*, are such as enter not at all, or little into the *Mesentery Veines*; But either at the first are not digestible by the *Stomach*, and therefore move immediately downwards to the *Gutts*; Or else are afterwards rejected by the *Mesentery Veines*, and so turne likewise downwards to the *Gutts*; and of these two kindes are most *Purgers*. But those that move *Vrine*, are such as are well digested of the *Stomach*, and well received also of the *Mesentery Veines*; So they come as farre as the *Liver*, which sendeth *Vrine* to the *Bladder*, as the *Whey of Bloud*: And those *Medicines* being Opening and Piercing, doe fortifie the Operation of the *Liver*, in sending downe the wheyey Part of the Bloud to the *Reines*. For *Medicines Vrinative* doe not worke by Rejection, and Indigestion, as *Solutive* doe.

44 There bee divers *Medicines*, which in greater *Quantity*, move *Stoole*, and in smaller, *Vrine*: And so contrariwise, some that in greater *Quantitie*, move *Vrine*, and in Smaller, *Stoole*. Of the former sort is *Rubarb*, and some others. The *Cause* is, for that *Rubarb* is a *Medicine*, which the Stomacke in a small Quantity doth digest, and overcome, (being not Flatuous, nor Loathsome;) and so sendeth it to the *Mesentery Veines*; And so being opening, it helpeth downe *Vrine*: But in a greater Quantitie, the *Stomacke* cannot overcome it, and so it goeth to the *Gutts*. *Pepper* by some of the *Ancients* is noted to bee of the second sort; which being in small *Quantity*, moveth winde in the Stomack and Gutts, and so expelleth by *Stoole*; But being in greater *Quantity*, dissipateth the *Wind*; And it selfe getteth to the *Mesentery veines*; And so to the *Liver*, and *Reines*; where, by Heating and Opening, it sendeth downe *Vrine* more plentifully.

Experiments in Consort touching *Meats* and *Drinks* that are *most Nourishing*

45 WE have spoken of *Evacuating* of the *Body*; we will now speake something of the *Filling* of it by *Restoratives* in *Consumptions*, and *Emaciating Diseases*. In *Vegetables*, there is one Part that is more Nourishing than an other; As *Graines*, and *Roots* nourish more, than the *Leaves*; in so much as the *Order* of the *Foliatanes* was put downe by the *Pope*, as finding Leaves unable to Nourish Mans Bodie. Whether there bee that difference in the Flesh of *Living Creatures*, is not well inquired: As whether *Livers*, and other *Entrails*, be not more Nourishing, than the *Outward Flesh*. We find that amongst the *Romans*, a *Gooses Liver* was a great Delicacy, In so much as they had Artificiall Means to make it faire, and great; But whether it were more Nourishing, appeareth not. It is certaine, that *Marrow* is more Nourishing than *Fat*. And I conceive that some Decoction of *Bones*, and *Sinewes*, stamped, and well strained, would be a very *Nourishing Broth*: Wee finde also that *Scotch Skinck*, (which is a Pottage of strong Nourishment,) is made

made with the *Knees*, and *Sinewes* of *Beefe*, but long boiled: *Ielley* alſo, which they uſe for a Reſtorative, is chiefly made of *Knuckles* of *Veale*. The *Pulp* that is within the *Crafiſh* or *Crab*, which they ſpice and butter, is more Nouriſhing than the *Fleſh* of the *Crab*, or *Crafiſh*. The *Yolkes* of *Egges* are clearly more Nouriſhing than the *Whites*. So that it ſhould ſeeme, that the Parts of *Living Creatures*, that lie more Inwards, nouriſh more than the Outward Fleſh: Except it be the *Braine*, which the Spirits prey too much upon, to leave it any great Vertue of Nouriſhing. It ſeemeth for the Nouriſhing of Aged Men, or Men in Conſumptions, ſome ſuch thing ſhould be Deviſed, as ſhould be halfe *Chylus*, before it be put into the Stomach.

Take two large *Capons*; perboyle them upon a ſoft fire, by the ſpace of an houre, or more, till in effect all the Bloud be gone. Adde in the Decoction the *Pill* of a *Sweet Limon*, or a good part of the *Pill* of a *Citron*, and a little *Mace*. Cut off the *Shankes*, and throw them away. Then with a good ſtrong Chopping-knife, mince the two *Capons*, bones and all, as ſmall as ordinary Minced Meat; Put them into a large neat Boulter; Then take a Kilderkin, ſweet, and well ſeaſoned, of foure Gallons of Beere, of 8. s. ſtrength, new as it commeth from the Tunning; Make in the Kilderkin a great Bung hole of purpoſe: Then thruſt into it, the Boulter (in which the *Capons* are) drawne out in length; Let it ſteepe in it three Dayes, and three Nights, the Bung-hole open, to worke; Then cloſe the Bung-hole, and ſo let it continue, a Day and an halfe; Then draw it into bottles, and you may drink it well after 3 dayes Botteling; And it will laſt 6 weekes (approved.) It drinketh freſh, flowreth and mantleth exceedingly; It drinketh not newiſh at all; It is an excellent Drinke for a Conſumption, to be drunke either alone, or Carded with ſome other Beere. It quencheth Thirſt, and hath no whit of windineſſe. Note, that it is not poſſible, that Meat and Bread, either in Broths, or taken with Drink, as is uſed, ſhould get forth into the veins, and outward Parts, ſo finely, and eaſily, as when it is thus Incorporate, and made almoſt a *Chylus* aforehand. 46

Triall would bee made of the like Brew with *Potado Roots*, or *Burr Roots*, or the *Pith* of *Artichoaks*, which are nouriſhing Meats: It may be tryed alſo, with other fleſh; As *Pheſant*, *Partridge*, *Young Porke*, *Pigge*, *Veniſon*, eſpecially of *young Deere*, &c. 47

A *Mortreſſe* made with the *Brawne* of *Capons*, ſtamped, and ſtrained, and mingled (after it is made) with like quantity, (at the leaſt,) of *Almond Butter*; is an excellent Meat to nouriſh thoſe that are weake; Better than *Blanck-Manger*, or *Ielley*: And ſo is the *Cullice* of *Cockes*, boyled thick with the like Mixture of *Almond Butter*: For the *Mortreſſe*, or *Cullice*, of it ſelfe, is more Savory and ſtrong; And not ſo fit for Nouriſhing of weake Bodies; But the *Almonds* that are not of ſo high a taſte as *Fleſh*, doe excellently qualifie it. 48

Indian Maiz hath (of certaine,) an excellent Spirit of Nouriſhment; But it muſt be throughly boyled, and made into a *Maiz-Creame* like a *Barley-Creame*. I judge the ſame of *Rize*, made into a Creame; For *Rize* is in *Turky*, and other Countries of the Eaſt, moſt fed upon; But it muſt bee throughly boiled in reſpect of the Hardneſſe of it: And alſo becauſe otherwiſe it bindeth the body too much. 49

Piſtachoes, ſo they be good, and not muſty, joyned with *Almonds* in *Almond Milke*; Or made into a *Milk* of themſelves, like unto *Almond Milke*, but more greene, are an excellent Nouriſher. But you ſhall doe well, to adde a little *Ginger*, ſcraped, becauſe they are not without ſome ſubtill windineſſe. 50

51 *Milke* warme from the Cow, is found to be a great Nourisher, and a good Remedy in *Consumptions*: But then you must put into it, when you Milke the Cow, two little bagges; the one of *Powder* of *Mint*, the other of *Powder* of *Red Roses*; For they keepe the *Milke* somewhat from Turning, or Crudling in the Stomach; And put in Sugar also, for the same cause, and partly for the Tasts sake; But you must drinke a good draught, that it may stay lesse time in the Stomach, lest it Cruddle: And let the Cup into which you milke the Cow, be set in a greater Cup of hot water, that you may take it warme. And *Cow-milke* thus prepared, I judge to be better for a *Consumption*, than *Asse-milke*, which (it is true) turneth not so easily, but it is a little harrish; Marry it is more proper for Sharpnesse of Urine, and Exulceration of the Bladder, and all manner of Lenifyings. *Womans milke* likewise is prescribed, when all faile; but I commend it not; as being a little too neare the Juyce of Mans Body, to be a good Nourisher; Except it be in *Infants*, to whom it is Naturall.

52 *Oyle* of *Sweet Almonds*, newly drawne, with *Sugar*, and a little *Spice*, spread upon Bread tosted, is an Excellent Nourisher; But then to keepe the *Oyle* from frying in the Stomach, you must drinke a good draught of Milde Beere after it; And to keepe it from relaxing the Stomach too much, you must put in a little Powder of Cinnamon.

53 The *Yolkes* of *Egges* are of themselves so well prepared by Nature for Nourishment; As (so they bee Potched, or Reare boyled) they need no other Preparation, or Mixture; yet they may bee taken also raw, when they are new laid, with *Malmesey*, or *Sweet Wine*; You shall doe well to put in some few Slices of *Eringium Roots*, and a little *Amber-grice*; For by this meanes, besides the immediate Facultie of Nourishment, such Drinke will strengthen the Back; So that it will not draw down the *Vrine* too fast; For too much *Vrine* doth alwayes hinder Nourishment.

54 *Mincing of Meat*, as in *Pies*, and *Buttered Minced Meat*, saveth the Grinding of the Teeth; And therfore, (no doubt) it is more Nourishing; Especially in Age; Or to them that have weake Teeth; But the Butter is not so proper for weake Bodies; And therefore it were good to moisten it with a little *Claret Wine*, Pill of *Limon*, or *Orenge*, cut small, *Sugar*, and a very little *Cinnamon*, or *Nutmegg*. As for *Chuetts*, which are likewise minced Meat, in stead of Butter, and Fat, it were good to moisten them, partly with *Creame*, or *Almond*, or *Pistachomilke*; or *Barley*, or *Maiz Creame*; Adding a little *Coriander Seed*, and *Carraway Seed*, and a very little *Saffron*. The more full Handling of *Alimentation* we reserve to the due place.

We have hitherto handled the Particulars *which yeeld best, and easiest, and plentifullest Nourishment; And now we will speake of the best* Meanes *of Conveying, and Converting the Nourishment.*

55 The First *Meanes* is, to procure that the *Nourishment* may not bee robbed, and drawne away; wherein that, which we have already said, is very Materiall; To provide, that the *Reines* draw not too strongly an over-great Part of the *Bloud* into *Vrine*. To this adde that Precept of *Aristotle*, that *Wine* bee forborne in all *Consumptions*; For that the *Spirits* of the *Wine*, doe prey upon the Roscide Juyce of the Body, and inter-common with the Spirits of the Body, and so deceive and robbe them of their Nourishment. And therefore if the *Consumption* growing from the weaknesse of the Stomach, doe force you to use *Wine*; let it alwayes be burnt; that the Quicker Spirits may evaporate; or at the least quenched with two little wedges of Gold, 6 or 7 times repeated. Adde also this Provisiõ, that there be not too much *Expence*

of

of the *Nourishment*, by *Exhaling*, and *Sweating*: And therefore if the Patient be apt to sweat, it must be gently restrained. But chiefly *Hippocrates* Rule is to be followed, who adviseth quite contrary to that which is in use: Namely, that the *Linnen*, or *Garment* next the Flesh, be in Winter drie, and oft changed; And in Summer seldome changed, and smeared over with Oyle; For certaine it is, that any Substance that is fat, doth a little fill the Pores of the Body, and stay Sweat, in some Degree. But the more cleanly way is, to have the *Linnen* smeared lightly over, with *Oyle* of *Sweet Almonds*; And not to forbeare shifting as oft as is fit.

The Second *Meanes* is, to send forth the *Nourishment* into the *Parts*, more strongly; For which, the working must bee by *Strengthening* of the *Stomach*; And in this, because the *Stomach* is chiefly comforted by *Wine*, and *Hot things*, which otherwise hurt; it is good to resort to *Outward Applications* to the *Stomach*: Wherein it hath beene tryed, that the *Quilts* of *Roses*, *Spices*, *Mastick*, *Wormewood*, *Mint*, &c. are nothing so helpfull, as to take a *Cake* of *New bread*, and to bedew it with a little *Sack*, or *Alegant*; And to drie it; And after it be dried a little before the Fire, to put it within a cleane Napkin, and to lay it to the Stomach: For it is certaine, that all Flower hath a potent Vertue of *Astriction*; In so much as it hardeneth a peece of flesh, or a Flower, that is laid in it: And therefore a *Bagg* quilted with *Bran*, is likewise very good; but it drieth somewhat too much; and therefore it must not lie long. 56

The Third *Meanes* (which may be a branch of the former) is to send forth the *Nourishment* the better by *Sleepe*. For we see, that Beares, and other *Creatures* that *sleep* in the Winter, wax exceeding fat: And certaine it is, (as it is commonly beleeved) that *Sleep* doth Nourish much; Both for that the Spirits doe lesse spend the Nourishment in *Sleep*, than when living *Creatures* are awake: And because (that which is to the present purpose) it helpeth to thrust out the Nourishment into the Parts. Therefore in Aged men, and weake Bodies, and such as abound not with Choller, a short *Sleep* after dinner doth helpe to Nourish; For in such Bodies there is no feare of an overhasty Digestion, which is the Inconvenience of Postmeridian *Sleeps*. *Sleepe* also in the Morning after the taking of somewhat of easie Digestion; As *Milke* from the Cow, *Nourishing Broth*, or the like; doth further Nourishment: But this would be done, sitting upright, that the *Milke* or *Broth* may passe the more speedily to the bottome of the Stomach. 57

The Fourth *Meanes* is to provide that the Parts themselves may draw to them the Nourishment strongly. There is an Excellent Observation of *Aristotle*; That a great reason, why plants (some of them) are of greater Age, than *Living Creatures*, is, for that they yearly put forth new Leaves, and Boughes; whereas *Living Creatures* put forth (after their Period of Growth,) nothing that is young, but Haire and Nailes, which are Excrements, and no Parts. And it is most certaine, that whatsoever is young, doth draw Nourishment better, than that which is Old; And then (that which is the Mysterie of that Observation) young *Boughes*, and *Leaves*, calling the Sap up to them; the same Nourisheth the *Body*, in the Passage. And this we see notably proved also, in that the oft cutting, or Polling of *Hedges*, *Trees*, and *Herbs*, doth conduce much to their Lasting. Transferre therefore this Observation to the Helping of Nourishment in *Living Creatures*: The Noblest and Principall Use whereof is, for the *Prolongation* of *Life*; *Restauration* of some Degree of *Youth*; and *Intenneration* of the *Parts*: For certain it is, that there are in *Living Creatures* Parts that Nourish, and Repaire easily; And Parts that 58

Nourish and Repaire hardly; And you must refresh, and renew those that are easie to Nourish, that the other may be refreshed, and (as it were) Drink in Nourishment, in the Passage. Now wee see that *Draught Oxen*, put into good Pasture, recover the Flesh of young Beefe; And Men after long Emaciating Diets, wax plump, and fat, and almost new: So that you may surely conclude, that the frequent and wise Use of those *Emaciating Diets*, and of *Purgings*; And perhaps of some kinde of *Bleeding*; is a principall Meanes of *Prolongation* of *Life*; & *Restoring* some Degree of *Youth*: For as we have often said, *Death* commeth upon *Living Creatures* like the Torment of *Mezentius*.

Mortua quinetiam jungebat Corpora vivis,
Componens Manibusque Manus, atque Oribus Ora.

For the Parts in Mans Body easily reparable, (as *Spirits*, *Bloud*, and *Flesh*) die in the Embracement of the Parts hardly reparable, (as *Bones*, *Nerves*, and *Membranes*;) And likewise some *Entrails* (which they reckon amongst the *Spermaticall Parts*) are hard to repaire: Though that Division of *Spermaticall*, and *Menstruall Parts*, be but a Conceit. And this same *Observation* also may be drawne to the present purpose of Nourishing Emaciated Bodies: And therefore *Gentle Frication* draweth forth the Nourishment, by making the Parts a little hungry, and heating them; whereby they call forth Nourishment the better. This *Frication* I wish to bee done in the Morning. It is also best done by the *Hand*, or a peece of *Scarlet wooll*, wet a little with *Oile* of *Almonds*, mingled with a small Quantitie of *Bay-Salt*, or *Saffron*; We see that the very Currying of Horses doth make them fat, and in good liking.

59 The fifth *Meanes* is, to further the very *Act*, of *Assimilation* of *Nourishment*; which is done by some outward *Emollients*, that make the Parts more apt to *Assimilate*. For which I have compounded an *Ointment* of Excellent Odour, which I call *Roman Ointment*, *vide* the *Receit*. The use of it would be betweene Sleeps; For in the latter Sleepe the Parts Assimilate chiefly.

Experiment Solitary touching *Filum Medicinale*.

60 THere bee many *Medicines*, which by themselves would doe no Cure, but perhaps Hurt; but being applyed in a certaine Order, one after another, doe great Cures. I have tryed (my selfe) a *Remedy* for the *Gout*, which hath seldome failed, but driven it away in 24. Houres space: It is first to apply a *Pultasse*; Of which *vide* the *Receit*; And then a *Bath* or *Fomentation*, of which *vide* the *Receit*; And then a *Plaister*, *vide* the *Receit*. The *Pultasse* relaxeth the Pores, and maketh the Humour apt to Exhale. The *Fomentation* calleth forth the Humour by Vapours; But yet in regard of the way made by the *Pultasse*, Draweth gently; And therefore draweth the Humours out; and doth not draw more to it; For it is a *Gentile Fomentation*, and hath withall a Mixture, (though very little) of some *Stupefactive*. The *Plaister* is a Moderate *Astringent Plaister*, which repelleth New Humour from falling. The *Pultasse* alone would make the Part more soft, and weake; And apter to take the Defluxion and Impression of the Humour. The *Fomentation* alone, if it were too weake, without way made by the *Pultasse*, would draw forth little; If too strong, it would draw to the Part, as well as draw from it. The *Plaister* alone, would pen the Humour already contained in the Part, and so exasperate it, as well as forbid new Humour. Therefore they must be all taken in Order, as is said. The *Pultasse* is to bee laid to, for two or three Houres: The *Fomentation* for a Quarter of an Houre, or somewhat better, being used hot, and seven or eight times repeated: The *Plaister* to continue on still, till the Part be well confirmed.

There

THere is a secret Way of *Cure*, (unpractized;) By *Assuetude* of that which in it selfe hurteth. *Poysons* have beene made, by some, Familiar, as hath beene said. *Ordinary keepers* of the *Sicke* of the *Plague*, are seldome infected. *Enduring* of *Tortures*, by *Custome*, hath been made more easie: The *Brooking* of Enormous *Quantity* of *Meats*, and so of *Wine* or *Strong Drinke*, hath beene, by *Custome*, made to bee without *Surfet*, or *Drunkennesse*. And generally *Diseases* that are *Chronicall*, as *Coughes*, *Phthisickes*, some kindes of *Palseyes*, *Lunacies*, &c. are most dangerous at the first: Therefore a wise *Physitian* will consider whether a *Disease* bee Incurable; Or whether the Just Cure of it bee not full of perill; And if hee finde it to bee such, let him resort to *Palliation*; And alleviate the *Symptome*, without busying himselfe too much with the perfect *Cure*: And many times, (if the *Patient* bee indeed patient,) that Course will exceed all Expectation. Likewise the *Patient* himselfe may strive, by little and little, to Overcome the *Symptome*, in the Exacerbation, and so, by time, turne Suffering into Nature.

Experiment Solitary touching *Cure by Custome*. 61

DIvers *Diseases*, especially *Chronicall*, (such as *Quartian Agues*;) are sometimes cured by *Surfet*, and *Excesses*: As *Excesse of Meat*, *Excesse of Drinke*, *Extraordinary Fasting*, *Extraordinary Stirring*, or *Lassitude*, and the like. The Cause is, for that *Diseases* of *Continuance* get an Adventitious Strength from Custome, besides their *Materiall Cause* from the *Humors*: So that the *Breaking* of the *Custome* doth leave them onely to their first *Cause*; which if it be any thing weak will fall off. Besides, such *Excesses* doe Excite and Spur *Nature*, which thereupon riseth more forcibly against the *Disease*.

Experiment Solitary touching *Cure by Excesse*. 62

THere is in the Body of Man a great *Consent* in the *Motion* of the severall Parts. Wee see, it is Childrens sport, to prove whether they can rubbe upon their Brest with one hand, and pat upon their Fore-head with another; And straight wayes they shall sometimes rubbe with both Hands, or pat with both hands. Wee see, that when the Spirits, that come to the Nosthrils, expell a bad Sent, the Stomach is ready to Expell by Vomit. We finde that in *Consumptions* of the *Lungs*, when Nature cannot expell by *Cough*, Men fall into *Fluxes* of the *Belly*, and then they die. So in *Pestilent Diseases*, if they cannot be expelled by *Sweat*, they fall likewise into *Loosenesse*, and that is commonly Mortall. Therefore *Physitians* should ingeniously contrive, how by *Motions* that are in their *Power*, they may excite *Inward Motions* that are not in their *Power*, by *Consent*: As by the *Stench* of *Feathers*, or the like, they cure the *Rising* of the *Mother*.

Experiment Solitary touching *Cure by Motion of Consent*. 63

HIppocrates *Aphorisme*, In *Morbis minus*, is a good profound *Aphorisme*. It importeth, that *Diseases*, contrary to the *Complexion*, *Age*, *Sex*, *Season of the yeare*, *Diet*, &c. are more dangerous than those that are Concurrent. A Man would thinke it should bee otherwise; For that, when the *Accident of Sicknesse*, and the *Naturall Disposition*, doe second the one the other, the *Disease* should bee more forcible: And so (no doubt) it is; if you suppose like *Quantity* of *Matter*. But that which maketh good the *Aphorisme*, is, Because such *Diseases* doe shew a greater *Collection of Matter*, by that they are able to overcome those *Naturall Inclinations* to the Contrary. And therefore in *Diseases* of that kinde, let the *Physitian* apply himselfe more to *Purgation*, than to *Alteration*; Because the offence is in the *Quantity*; and the *Qualities* are rectified of themselves.

Experiment Solitary touching *Cure of Diseases which are contrary to Predisposition*. 64

Experiment Solitary touching *Preparations* before *Purging*, and *setling* of the *Body* afterward 65

PHysitians do wisely prescribe, that there bee *Preparatives* used before *Iust Purgations*; For certaine it is, that *Purgers* doe many times great Hurt, if the Body bee not accommodated, both before, and after the *Purging*. The Hurt that they doe, for want of *Preparation* before *Purging*, is by the Sticking of the Humours, and their not comming faire away; Which causeth in the Bodie great Perturbations, and ill Accidents, during the *Purging*; And also, the diminishing, and dulling of the Working of the *Medicine* it selfe, that it purgeth not sufficiently; Therefore the worke of *Preparation* is double; to make the *Humours fluide*, and mature; And to make the *Passages* more open: For both those helpe to make the Humours passe readily. And for the former of these, *Sirrups* are most profitable; And for the Latter, *Apozumes*, or *Preparing Broths*; *Clisters* also helpe lest the *Medicine* stop in the Guts, and worke gripingly. But it is true, that *Bodies abounding* with *Humours*; And *fat Bodies*; And *Open Weather*; are *Preparatives* in themselves; because they make the Humours more fluide. But let a *Physitian* beware, how hee purge after hard *Frosty Weather*, and in a *Leane Body*, without *Preparation*. For the Hurt, that they may doe after *Purging*; It is caused by the *Lodging* of some *Humours* in *ill Places*: For it is certaine, that there bee *Humours*, which somewhere placed in the Body, are quiet, and doe little hurt; In other Places, (especially Passages,) do much mischiefe. Therefore it is good, after *Purging*, to use *Apozumes*, and *Broths*, not so much *Opening* as those used before *Purging*, but *Absterfive* and *Mundifying Clisters* also are good to conclude with, to draw away the Reliques of the Humors, that may have descended to the *Lower Region* of the *Bodie*.

Experiment Solitary touching *Stanching of Bloud*. 66

BLoud is stanched divers wayes. First by *Astringents*, and *Repercussive Medicines*. Secondly by *Drawing* of the *Spirits* and *Bloud inwards*; which is done by *cold*; As *Iron* or a *Stone* laid to the neck doth stanch the Bleeding at the Nose; also it hath been tryed, that the *Testicles* being put into sharp Vineger, hath made a suddaine Recesse of the Spirits, and stanched Bloud. Thirdly by the *Recesse of the bloud by Sympathy*. So it hath beene tryed, that the part that bleedeth, being thrust into the Body of a Capon, or Sheepe, new ript and bleeding, hath stanched *Bloud*; The *Bloud*, as it seemeth, sucking & drawing up, by similitude of substance, the *Bloud* it meeteth with, and so it selfe going backe. Fourthly by Custome and Time; So the Prince of *Aurange*, in his first hurt, by the *Spanish Boy*, could finde no meanes to stanch the *Bloud*, either by *Medicine* or *Ligament*; but was faine to have the *Orifice* of the *Wound* stopped by *Mens Thumbs*, succeeding one another, for the space at the least of two Dayes; And at the last the bloud by *Custome* onely retired. There is a fifth Way also in use, to let *Bloud* in an *Adverse Part*, for a *Revulsion*.

Experiment Solitary touching *Change* of *Aliments* and *Medicines*. 67

IT helpeth, both in *Medicine*, and *Aliment*, to Change and not to continue the same *Medicine* and *Aliment* still. The Cause is, for that *Nature* by continuall Use of any Thing, groweth to a *Sacietie*, and *Dulnesse*, either of *Appetite*, or *Working*. And we see that *Assuetude* of *Things Hurtfull* doth make them leese their force to Hurt; As *Poyson*, which with use some have brought themselves to brook. And therefore it is no marvaile, though *Things helpfull* by *Custome*, leese their force to Helpe, I count *Intermission* almost the same thing with *Change*; For that, that hath beene intermitted, is after a sort new.

It

IT is found by Experience, that in *Diets of Guaiacum*, *Sarza*, and the like (especially if they be strict,) the *Patient* is more troubled in the beginning, than after continuance; Which hath made some of the more delicate Sort of patients, give them over in the middest; Supposing that if those Diets trouble them so much at first, they shall not be able to endure them to the End. But the Cause is, for that all those *Diets*, doe drie up *Humours*, *Rheumes*, and the like; And they cannot Drie up untill they have first attenuated; And while the *Humour* is attenuated, it is more Fluid, than it was before, and troubleth the Body a great deale more, untill it bee dried up, and consumed. And therefore *Patients* must expect a due time, and not check at them at the first.

Experiment Solitary touching *Diets*. 68

THe *Producing* of *Cold* is a thing very worthy the Inquisition; both for Use, and Disclosure of Causes. For *Heat* and *Cold* are *Natures* two hands, whereby she chiefly worketh: And *Heat* we have in readinesse, in respect of the *Fire*; But for *Cold* we must stay till it commeth; or seeke it in deep Caves, or high Mountaines: And when all is done, wee cannot obtaine it in any great degree: For *Furnaces* of *Fire* are farre hotter, than a *Summers Sunne*; But *Vaults* or *Hils* are not much Colder than a *Winters Frost*.

Experiments in Consort touching the *Production* of *Cold*.

The first *Meanes* of *Producing Cold*, is that which *Nature* presenteth us withall; Namely the *Expiring* of *cold* out of the *Inward Parts of the Earth* in *Winter*, when the Sunne hath no power to overcome it; the *Earth* being (as hath been noted by some) *Primum Frigidum*. This hath been asserted, as well by Ancient, as by Moderne *Philosophers*: It was the Tenet of *Parmenides*. It was the opinion of the *Author* of the discourse in *Plutarch*, (for I take it, that booke was not *Plutarchs* owne) *De primo Frigido*. It was the opinion of *Telesius*, who hath renewed the *Philosophie* of *Parmenides*, and is the best of the *Novelists*. 69

The second *Cause* of *Cold* is the *Contact* of *Cold Bodies*; For *Cold* is Active and Transitive into Bodies Adjacent, as well as *Heat*: which is seen in those things that are touched with *Snow* or *Cold water*. And therefore, whosoever will bee an *Inquirer* into *Nature*, let him resort to a *Conservatory* of *Snow* and *Ice*; Such as they *use for delicacy*, to coole Wine in Summer: Which is a Poore and Contemptible use, in respect of other uses, that may bee made of such *Conservatories*. 70

The Third *Cause* is the *Primary Nature* of all *Tangible Bodies*: For it is well to bee noted, that all Things whatsoever (*Tangible*) are of themselves *Cold*; Except they have an Accessory *Heat* by *fire*; *Life*; or *Motion*: For even the *Spirit* of *Wine*, or *Chymicall Oyles*, which are so hot in Operation, are to the first Touch, *Cold*; And *Aire* it selfe compressed, and Condensed a little by blowing, is *Cold*. 71

The Fourth *Cause* is the *Density of the Body*; For all *Dense Bodies* are *Colder* than most other *Bodies*; As *Mettals*, *Stone*, *Glasse*; and they are longer in *Heating* than *Softer Bodies*. And it is certaine, that *Earth*, *Dense*, *Tangible*, hold all of the Nature of *Cold*. The Cause is, for that all *Matters Tangible* being *Cold*, it must needs follow, that where the *Matter* is most Congregate, the *Cold* is the greater. 72

The

73 The Fifth *Cause* of *Cold*, or rather of increase and vehemency of *Cold*, is a *Quick Spirit inclosed in a Cold Body*: As will appeare to any that shall attentively consider of *Nature* in many Instances. Wee see *Nitre* (which hath a *Quick Spirit*) is Cold; more *Cold* to the Tongue, than a Stone; So *Water* is *Colder* than *Oile*, because it hath *a Quicker Spirit*; For all *Oile*, though it hath the Tangible Parts better digested than *Water*, yet hath it a duller *Spirit*: So *Snow* is *Colder* than *Water*, because it hath *more Spirit* within it: So wee see that *Salt* put to *Ice* (as in the producing of the *Artificiall Ice*) increaseth the *Activity* of *Cold*: So some *Insecta* which have *Spirit* of *Life*, as *Snakes*, and *Silkwormes*, are to the touch, *Cold*. So *Quick-silver* is the *Coldest* of Metals, because it is *fullest of Spirit*.

74 The Sixth *Cause* of *Cold* is *the Chasing and Driving away of Spirits*, such as have some *Degree of Heat*: For the Banishing of the *Heat* must needs leave any Body *Cold*. This wee see in the Operation of *Opium*, and *Stupefactives*, upon the Spirits of living Creatures: And it were not amisse to trie *Opium*, by laying it upon the Top of a *Weather-glasse*, to see whether it will contract the *Ayre*: But I doubt it will not succeed: For besides that the vertue of *Opium* will hardly penetrate thorow such a Body as Glasse, I conceive that *Opium*, and the like, make the *Spirits* flie rather by *Maligniy*, than by *Cold*.

75 Seventhly, the same *Effect* must follow upon the *Exhaling or Drawing out of the warme Spirits*, that doth upon the Flight of the Spirits. There is an Opinion, that the *Moone* is Magneticall of *Heat*, as the *Sunne* is of *Cold* and *Moisture*: It were not amisse therefore to trie it, with *Warme-waters*; The one exposed to the Beames of the *Moone*; the other with some Skreene betwixt the Beames of the *Moone* and the *water*; As wee use to the *Sunne* for Shade; And to see whether the former will coole sooner. And it were also good to inquire, what other Meanes there may bee, to draw forth the *Exile heat*, which is in the *Aire*; for that may be a Secret of great Power to Produce *Cold weather*.

Experiments in Consort touching the *Version* and *Transmutation of Aire into water*.

WEE have formerly set down the *Meanes of turning Aire into water*, in the *Experiment* 27. But because it is *Magnale Naturæ*; and tendeth to the subduing of a very great effect; And is also of Manifold use; wee will adde some *Instances* in *Consort* that give light thereunto.

76 It is reported by some of the *Ancients*, that *Sailers* have used, every Night, to hang *Fleeces of Wooll* on the sides of their *Ships*, the *Wooll* towards the water; And that they have crushed fresh Water out of them, in the Morning, for their use. And thus much we have tryed, that a *Quantitie* of *Wooll* tyed loose together, being let downe into a deepe *Well*; And hanging in the *Middle*, some three Fathome from the water, for a night, in the Winter time; increased in weight, (as I now remember) to a fifth Part.

77 It is reported by one of the *Ancients*, that in *Lydia*, neare *Pergamus*, there were certaine *Work-men*, in time of *Wars* fled into *Caves*; And the Mouth of the *Caves* being stopped by the Enemies, they were famished. But long time after the dead Bones were found; And some Vessels which they had carried with them; And the Vessels full of *Water*; And that *Water*, thicker, and more towards Ice, than Common *Water*: which is a Notable Instance of *Condensation*, and *Induration* by *Buriall under Earth*, (in Caves) for long time; And of *version* also (as it should seeme,) of *Aire* into *Water*;

if

if any of those vessels were Empty. Trie therefore a small *Bladder* hung in *Snow*; And the like in *Nitre*; And the like in *Quick-silver* : And if you finde the *Bladders* fallen, or shrunke; you may bee sure the *Aire* is condensed by the *Cold* of those *Bodies*; As it would bee in a *Cave* under *Earth*.

It is reported of very good credit, that in the *East-Indies*, if you set a Tub of *Water* open in a Roome where *Cloves* are kept, it will bee drawne drie in 24.houres; Though it stand at some distance from the *Cloves*. In the Countrey, they use many times, in deceit, when their *Wooll* is new shorne, to set some Pailes of *Water* by, in the same Roome; to increase the weight of the *Wooll*. But it may bee, that the Heat of the *Wooll*, remaining from the body of the Sheepe; or the Heat gathered by the lying close of the *Wooll*, helpeth to draw the watry Vapour; But that is nothing to the *Version*. 78

It is reported also credibly, that *Wooll* new shorne, being laid casually upon a *Vessell* of *Verjuyce*, after some time, had drunke up a great part of the *Verjuyce*, though the Vessell were whole without any *Flaw*, and had not the Bung-hole open. In this *Instance*, there is (upon the by) to be noted, the *Percolation*, or *Suing* of the *Verjuyce* through the wood; For *Verjuyce* of it selfe would never have passed thorow the wood : So as, it seemeth, it must bee first in a kinde of Vapour, before it passe. 79

It is especially to be noted, that the Cause, that doth facilitate the *Version* of *Aire* into *Water*, when the *Aire* is not in grosse, but subtilly mingled with *Tangible Bodies*, is, (as hath beene partly touched before,) for that *Tangible Bodies* have an Antipathy with *Aire*; and if they finde any *Liquid Body*, that is more dense, neare them, they will draw it. And after they have drawne it, they will condense it more, and in effect incorporate it; For wee see that a *Spunge*, or *Wooll*, or *Sugar*, or a *woollen cloth*, being put but in part, in *Water*, or *Wine*, will draw the *Liquor* higher, and beyond the place : where the *water* or *wine* commeth. Wee see also, that *Wood*, *Lute-strings*, and the like, doe swell in *moist Seasons* : As appeareth by the *Breaking* of the *Strings*, the *Hard Turning* of the *Pegs*, and the *Hard drawing forth of Boxes*, and *Opening* of *Wainscot doores*; which is a kinde of *Infusion*: And is much like to an *Infusion* in water, which will make wood to swell: As we see in the Filling of the Chops of Boules, by laying them in water. But for that part of these *Experiments*, which concerneth *Attraction*, wee will reserve it to the proper *Title* of *Attraction*. 80

There is also a *Version of Aire into water*, seene in the *Sweating* of *Marbles*, and other *Stones*. And of *Wainscot* before and in moist weather: This must be, either by some *Moysture* the Body yeeldeth ; Or else by the Moist Aire thickned against the hard body. But it is plaine, that it is the latter; For that wee see *Wood painted with Oyle Colour*, will sooner gather drops in a moist Night, than *Wood* alone: which is caused by the Smoothnesse and Closenesse; which letteth in no part of the Vapour, and so turneth it backe, and thickeneth it into Dew. Wee see also, that *Breathing* upon a *Glasse*, or Smooth body, giveth a Dew; And in *Frosty Mornings* (such as we call *Rime frosts*) you shall finde drops of Dew upon the Inside of Glasse-windowes ; And the *Frost* it selfe upon the ground, is but a *Version* or *Condensation*, of the Moist vapours of the Night, into a watry substance : *Dewes* likewise, and *Raine*, are but the Returnes of Moist vapours Condensed; The Dew, by the *Cold* onely of the Sunnes departure, which is the gentler *Cold*; *Raines*, by the *Cold* of that, which they call the *Middle Region* of the *Aire*; which is the more violent *Cold*. 81

It is very probable (as hath beene touched) that that, which will turne 82

Water

Water into *Ice*, will likewise turne *Aire* some Degree nearer unto *Water*. Therfore trie the *Experiment* of the *Artificiall Turning Water into Ice* (whereof we shall speake in another place) with *Aire* in place of *Water*, and the *Ice* about it. And although it bee a greater Alteration to turne *Aire* into *Water*, than *Water* into *Ice*: Yet there is this Hope, that by Continuing the *Aire* longer time, the effect will follow; For that Artificiall *Conversion* of *Water* into *Ice*, is the worke of a few Houres; And this of *Aire* may be tried by a Moneths space, or the like.

Experiments in Consort touching *Induration of Bodies.*

INduration, or *Lapidification*, of Substances more soft, is likewise another degree of *Condensation*; And is a great *Alteration* in Nature. The Effecting and Accelerating thereof is very worthy to bee inquired. It is effected by three Meanes. The first is by *Cold*; whose Propertie is to *Condense*, and constipate, as hath beene said. The Second is by *Heat*; which is not proper but by consequence; For the *Heat* doth attenuate; And by Attenuation doth send forth the Spirit and moister Part of a Body; And upon that, the more grosse of the Tangible Parts doe contract and serre themselves together; Both to avoid *Vacuum* (as they call it;) And also to Munite themselves against the Force of the *Fire*, which they have suffered. And the Third is by *Assimilation*; when a Hard Body Assimilateth a Soft, being contiguous to it.

The Examples of *Induration*, taking them promiscuously, are many: As the Generation of *Stones* within the Earth, which at the first are but Rude Earth, or Clay: And so of *Minerals*, which come (no doubt) at first, of Juyces Concrete, which afterward indurate: And so of *Porcellane*, which is an *Artificiall Cement*, buried in the Earth a long time: And so the Making of *Bricke*, and *Tile*: Also the Making of *Glasse*, of a certain Sand, and Brake-Roots, and some other Matters: Also the *Exudations* of *Rock-Diamonds*, and *Crystall*, which harden with time: Also the *Induration* of *Bead-Amber*, which at first is a soft Substance; As appeareth by the *Flies*, and *Spiders*, which are found in it; And many more: But we will speak of them distinctly.

83 For *Indurations* by *Cold*, there be few Trials of it; For we have no strong or intense *Cold* here on the Surface of the *Earth*, so neare the Beames of the Sunne, and the Heavens. The likelieſt Triall is by *Snow*, and *Ice*; For as *Snow* and *Ice*, especially being holpen, and their *Cold* activated by *Nitre*, or *Salt*, will turne *Water* into *Ice*, and that in a few houres; So it may be, it will turne *Wood*, or *Stiffe Clay*, into *Stone*, in longer time. Put therefore, into a *Conserving Pit* of *Snow*, and *Ice*, (adding some quantity of *Salt*, and *Nitre*,) a Peece of *Wood*, or a Peece of *Tough Clay*, and let it lie a moneth, or more.

84 Another Triall is by *Metalline Waters*, which have virtuall *Cold* in them.

Put

Put therefore *Wood*, or *Clay*, into *Smiths water*, or other *Metalline water*; And try whether it will not harden in ſome reaſonable time. But I underſtand it, of *Metalline Waters*, that come by Waſhing, or Quenching; And not of *Strong Waters* that come by diſſolution; for they are too Corroſive to conſolidate.

It is alreadie found, that there are ſome *Naturall Spring-waters*, that will Inlapidate *Wood*; So as you ſhall ſee one peece of *Wood*, whereof the Part above the *Water* ſhall continue *Wood*; And the Part under the *Water* ſhall be turned into a kinde of *Gravelly Stone*. It is likely thoſe *Waters* are of ſome *Metalline Mixture*; But there would bee more particular Inquiry made of them. It is certaine, that an *Egge* was found, having lien many yeares in the bottome of a Moat, where the Earth had ſomewhat overgrowen it; And this Egge was come to the Hardneſſe of a *Stone*; And had the Colours of the white and yolke perfect: And the Shell ſhining in ſmall graines like Sugar, or Alablaſter. 85

Another Experience there is of *Induration* by *Cold*, which is already found; which is, that *Metalls*, themſelves are hardened by often *Heating* and *Quenching* in *Cold water*: For *Cold* ever worketh moſt potently upon *Heat* precedent. 86

For *Induration* by *Heat*, it muſt be conſidered, that *Heat*, by the Exhaling of the Moiſter Parts, doth either harden the Bodie; As in *Bricks*, *Tiles*, &c; Or if the *Heat* be more fierce, maketh the groſſer Part it ſelfe, Runne and Melt; As in the making of ordinary *Glaſſe*; And in the *Vitrification* of *Earth*, (As we ſee in the Inner Parts of *Furnaces*;) And in the *Vitrification* of *Bricke*; And of *Metals*. And in the former of theſe, which is the Hardening by baking, without Melting, the *Heat* hath theſe degrees; Firſt, it *Indurateth*; and then maketh *Fragile*; And laſtly it doth *Incinerate* and *Calcinate*. 87

But if you deſire to make an *Induration* with *Toughneſſe*, and leſſe Fragilitie; A middle way would be taken; Which is that which *Ariſtotle* hath well noted; But would be throughly verified. It is, to decoct *Bodies* in *Water*, for two or three dayes; But they muſt bee ſuch bodies, into which the *Water* will not enter; As *Stone*, and *Metall*. For if they bee Bodies into which the *Water* will enter, then long Seething, will rather Soften than indurate them; As hath beene tryed in *Egges*, &c. Therefore, Softer *Bodies* muſt be put into Bottles; And the Bottles hung into Water ſeething, with the mouths open, above the *Water*; that no *Water* may get in; For by this Meanes, the virtuall *Heat* of the *Water* will enter; And ſuch a *Heat*, as will not make the Body aduſt, or fragile; But the Subſtance of the *Water* will be ſhut out. This *Experiment* we made; and it ſorted thus. It was tryed with a peece of *Free-Stone*, and with *Pewter*, put into the *Water* at large. The *Free-Stone* we found received in ſome *Water*; For it was ſofter, and eaſier to ſcrape, than a peece of the ſame *Stone* kept drie. But the *Pewter* into which no *Water* could enter, became more white, and liker to Silver, and leſſe flexible, by much. There were alſo put into an Earthen Bottle, placed as before, a good Pellet of *Clay*, a Peece of *Cheeſe*, a Peece of *Chalke*, and a Peece of *Free-Stone*. The *Clay* came forth almoſt of the Hardneſſe of *Stone*; The *Cheeſe* likewiſe very hard, and not well to be cut: The *Chalke* and the *Free-Stone* much harder than they were. The colour of the *Clay* inclined not a whit to the Colour of *Brick*, but rather to white, as in ordinary Drying by the Sunne. Note, that all the former Trials were made by a Boyling upon a good hot Fire, renewing the *Water* as it conſumed, with other hot *Water*; But the Boyling 88

was

was but for twelve houres onely; And it is like that the Experiment would have beene more effectuall, if the Boyling had been for two or three dayes, as we prescribed before.

89 As touching *Assimilation*, (for there is a degree of *Assimilation* even in Inanimate bodies) wee see Examples of it in some *Stones* in *Clay-Grounds*, lying neare to the top of the Earth, where *Pebble* is; In which you may manifestly see divers *Pebbles* gathered together, and a Crust of *Cement* or *Stone* between them, as hard as the *Pebbles* themselves: And it were good to make a Triall of purpose, by taking *Clay*, and putting in it divers *Pebble Stones*, thicke set, to see whether in continuance of time, it will not bee harder than other *Clay* of the same lumpe, in which no *Pebbles* are set. Wee see also in Ruines of old Wals, especially towards the Bottome, the *Morter* will become as hard as the *Brick*; wee see also, that the *Wood* on the sides of *Vessels* of *Wine*, gathereth a Crust of *Tartar*, harder than the *Wood* it selfe; And Scales likewise grow to the *Teeth*, harder than the *Teeth* themselves.

90 Most of all, *Induration* by *Assimilation* appeareth in the Bodies of *Trees*, and *living Creatures*: For no Nourishment that the *Tree* receiveth, or that the *living Creature* receiveth, is so hard as *Wood*, *Bone*, or *Horne*, *&c.* but is *Indurated* after by *Assimilation*.

Experiment Solitary touching the *Version of Water into Aire.*

91 THe Eye of the understanding, is like the Eye of the Sense: For as you may see great Objects through small Crannies, or Levels: So you may see great *Axiomes* of *Nature*, through small and Contemptible *Instances*. The *Speedy Depredation* of *Aire* upon *watry Moisture*, and *Version* of the same into *Aire*, appeareth in nothing more visible, than in the sudden Discharge, or vanishing, of a little *Cloud* of *Breath*, or *Vapour*, from *Glasse*, or the *Blade* of a *Sword*, or any such Polished Body; Such as doth not at all Detaine, or Imbibe the Moisture; For the Mistinesse scattereth and breaketh up suddenly. But the like *Cloud*, if it were *Oylie*, or *Fatty*, will not discharge; Not because it sticketh faster; But because *Aire* preyeth upon *Water*; And *Flame*, and *Fire*, upon *Oyle*; And therefore, to take out a Spot of Grease, they use a *Coale* upon browne Paper; Because *Fire* worketh upon Grease, or *Oyle*, as *Aire* doth upon *Water*. And wee see *Paper oyled*, or *Wood oyled*, or the like, last long moist; but *Wet* with *Water*, drie, or putrifie sooner. The Cause is, for that *Aire* medleth little with the *Moisture* of *Oyle*.

Experiment Solitary touching the *Force of Vnion.*

92 THere is an Admirable demonstration, in the same trifling *Instance* of the *little Cloud* upon *Glasse*, or *Gemmes*, or *Blades* of *Swords*, of the *Force of Vnion*, even in the least Quantities, and weakest Bodies, how much it conduceth to Preservation of the present Forme; And the Resisting of a New. For marke well the discharge of that *Cloud*; And you shall see it ever break up, first in the Skirts, and last in the middest. We see likewise, that much *Water* draweth forth the Juyce of the Body Infused; But little water, is imbibed by the Body: And this is a Principall Cause, why in Operation upon *Bodies*, for their *Version* or *Alteration*, the Triall in great Quantities, doth not answer the Triall in small; And so deceiveth many; For that (I say) the greater Body, resisteth more any Alteration of Forme, and requireth farre greater Strength in the Active Body, that should subdue it.

Experiment Solitary touching the *Producing of Feathers and Haires of divers Colours.*

93 WE have spoken before, in the fifth *Instance*, of the Cause of *Orient Colours*, in *Birds*; Which is by the Fineness of the Strainer; wee will now endevour to reduce the same *Axiome* to a *Worke*. For this Writing

ting of our *Sylva Sylvarum*, is (to speake properly) not *Naturall History*, but a high kinde of *Naturall Magicke*. For it is not a Description onely of Nature, but a Breaking of Nature, into great and strange Workes. Trie therefore, the Anointing over of *Pigeons*, or other *Birds*, when they are but in their Downe; Or of *Whelps*, cutting their Haire as short as may bee; Or of some other Beast; with some oyntment, that is not hurtfull to the Flesh; And that will harden, and stick very close; And see whether it will not alter the Colours of the *Feathers*, or *Haire*. It is received, that the *Pulling* off, the first *Feathers* of *Birds*, cleane, will make the new come forth *White*: And it is certaine, that *White* is a penurious Colour, and where moisture is scant. So *Blew Violets*, and other *Flowers*, if they be starved, turne Pale and *White*; *Birds*, and *Horses*, by Age, or Scarres, turne *White*: And the *Hoare Haires* of Men, come by the same reason. And therefore in *Birds*, it is very likely, that the *Feathers* that come first, will be many times of divers Colours, according to the Nature of the *Bird*; For that the Skinne is more porous; But when the Skin is more shut, and close, the Feathers will come *White*. This is a good *Experiment*, not onely for the Producing of *Birds* and *Beasts* of strange Colours, but also, for the Disclosure of the Nature of *Colours* themselves; which of them require a finer Porositie, and which a grosser.

Experiment Solitary touching *the Nourishment of Living Creatures before they be brought forth.*

94

IT is a worke of Providence, that hath beene truly observed by some; That the *Yolke* of the *Egge*, conduceth little to the *Generation* of the *Bird*; But onely to the *Nourishment* of the same: For if a *Chicken* be opened, when it is new hatched; you shall finde much of the *Yolke* remaining. And it is needfull, that *Birds*, that are shaped without the Females Wombe, have in the *Egge*, as well Matter of Nourishment, as Matter of generation for the Body. For after the *Egge* is laid, and severed from the Body of the *Hen*; It hath no more Nourishment from the *Hen*; But onely a quickning *Heat* when shee sitteth. But Beasts, and Men need not the matter of Nourishment within themselves; Because they are shaped within the Wombe of the Female, and are Nourished continually from her Body.

Experiments in Consort touching *Sympathy and Antipathy for Medicinall use.*

95

IT is an Inveterate and received Opinion, that *Cantharides* applyed to any Part of the Body, touch the *Bladder*, and exulcerate it, if they stay on long. It is likewise Received, that a kinde of *Stone*, which they bring out of the *West Indies*, hath a peculiar force to move Gravell, and to dissolve the *Stone*; In so much, as laid but to the Wrest, it hath so forcibly sent downe Gravell, as Men have beene glad to remove it; It was so violent.

96

It is received and confirmed by daily Experience, that the *Soales* of the *Feet* have great Affinity with the *Head*, and the *Mouth* of the *Stomach*: As wee see, *Going wet-shod*, to those that use it not, affecteth both: Applications of *hot Powders* to the *Feet* attenuate first, and after drie the *Rheume*: And therefore a *Physitian*, that would be Mysticall, prescribeth, for the Cure of the *Rheume*, that a Man should walke Continually upon a *Camomill Alley*; Meaning, that he should put *Camomill* within his Sockes. Likewise *Pigeons bleeding*, applyed to the *Soales* of the *Feet*, ease the *Head*: And *Soporiferous Medicines* applyed unto them, provoke *Sleepe*.

97

It seemeth, that as the *Feet* have a Sympathy with the *Head*; So the *Wrests* and *Hands*, have a Sympathy with the *Heart*; Wee see the Affects and Passions of the *Heart*, and *Spirits*, are notably disclosed by the *Pulse*: And it is often tried, that Juyces of *Stock-Gilly-Flowers*, *Rose-Campian*, *Garlicke*, and other things; applyed to the *Wrests*, and renewed; have cured long *Agues*.

And I conceive, that washing with certaine *Liquours*, the *Palmes* of the *Hands*, doth much good: And they doe well in *Heats* of *Agues*, to hold in the Hands, *Egges* of *Alablaster*, and *Balls* of *Crystall*.

Of these things we shall speake more, when wee handle the Title *of* Sympathy *and* Antipathy, *in the proper Place*.

Experiment Solitary touching the *Secret Processes of Nature*.

98

THe Knowledge of man (hitherto) hath been determined by the View, or Sight; So that whatsoever is Invisible, either in respect of the *Fineness of the Body* it selfe; Or the *Smallnesse of the Parts*; Or of the *Subtilitie of the Motion*; is little inquired. And yet these be the Things that Governe Nature principally; And without which, you cannot make any true *Analysis* and Indication of the Proceedings of Nature. The *Spirits* or *Pneumaticals*, that are in all *Tangible Bodies*, are scarce knowne. Sometimes they take them for *Vacuum*; whereas they are the most Active of Bodies. Sometimes they take them for *Airè*; From which they differ exceedingly, as much as Wine from Water; And as Wood from Earth. Sometimes they will have them to be *Naturall Heat*, or a *Portion* of the *Element of Fire*; Whereas some of them are crude, and cold. And sometimes they will have them to bee the *Vertues* and *Qualities* of the *Tangible Parts*, which they see; whereas they are Things by themselves. And then, when they come to Plants and living Creatures, they call them *Soules*. And such Superficiall Speculations they have; Like Prospectives, that shew things inward, when they are but Paintings. Neither is this a Question of Words, but infinitely materiall in *Nature*. For *Spirits* are nothing else but a *Naturall Body*, rarified to a Proportion, and included in the *Tangible Parts* of *Bodies*, as in an Integument. And they be no lesse differing one from the other, than the *Dense* or *Tangible Parts*: And they are in all *Tangible Bodies* whatsoever, more or lesse: And they are never (almost) at rest: And from them, and their *Motions*, principally proceed *Arefaction*, *Colliquation*, *Concoction*, *Maturation*, *Putrefaction*, *Vivification*, and most of the Effects of *Nature*: For, as we have figured them in our *Sapientiâ Veterum*, in the *Fable* of *Proserpina*, you shall in the Infernall Regiment heare little Doings of *Pluto*, but most of *Proserpina*: For *Tangible Parts* in *Bodies* are Stupide things; And the *Spirits* doe (in effect) all. As for the differences of *Tangible Parts* in *Bodies*, the industry of the *Chymists* hath given some light, in discerning by their Separations, the *Oyly*, *Crude*, *Pure*, *Impure*, *Fine*, *grosse Parts* of *Bodies*, and the like. And the *Physitians* are content to acknowledge, that *Herbs* and *Drugs* have divers Parts; As that *Opium* hath a Stupefactive Part, and a Heating Part; The one moving Sleepe, the other a Sweat following; And that *Rubarb* hath Purging Parts, and Astringent Parts, &c. But this whole *Inquisition* is weakly and Negligently handled. And for the more subtill differences of the *Minute Parts*, and the Posture of them in the Body, (which also hath great Effects) they are not at all touched: As for the *Motions* of the *Minute Parts of Bodies*, which doe so great Effects, they have not beene observed at all; because they are Invisible, and incurre not to the Eye; but yet they are to be deprehended by Experience: As *Democritus* said well, when they charged him to hold, that the World was made of such little Moats, as were seene in the Sunne; *Atomus* (saith he) *necessitate Rationis & Experientiæ esse convincitur*; *Atomum enim nemo unquam vidit*. And therefore the Tumult in the Parts of Solide Bodies, when they are compressed, which is the Cause of all *Flight* of Bodies thorow the Aire, and of other *Mechanicall Motions*, (as hath beene partly touched before, and shall be throughly handled in due place,) is not seene

at

at all. But nevertheleſſe, if you know it not, or enquire it not attentively and diligently, you ſhall never be able to diſcerne, and much leſſe to produce, a Number of *Mechanicall Motions*. Againe, as to the *Motions Corporall*, within the Encloſures of Bodies, whereby the Effects (which were mentioned before) paſſe between the *Spirits*, and the *Tangible Parts*, (which are, *Arefaction*, *Colliquation*, *Concoction*, *Maturation*, &c.) they are not at all handled. But they are put off by the Names of *Vertues*, and *Natures*, and *Actions*, and *Paſſions*, and ſuch other *Logicall* Words.

Experiment Solitary touching the *Power of Heat*. 99

IT is certaine, that of all *Powers* in *Nature*, *Heat* is the chiefe; both in the Frame of *Nature*, and in the workes of *Art*. Certaine it is likewiſe, that the Effects of *Heat*, are moſt advanced, when it worketh upon a Body, without loſſe or diſſipation of the Matter; for that ever betrayeth the Account. And therefore it is true, that the power of *Heat* is beſt perceived in *Diſtillations*, which are performed in cloſe Veſſels, and Receptacles. But yet there is a higher Degree; For howſoever *Diſtillations* doe keepe the Body in Cells, and Cloyſters, without Going abroad, yet they give ſpace unto Bodies to turne into Vapour; To returne into Liquour; And to Separate one part from another. So as *Nature* doth Expatiate, although it hath not full Liberty: Whereby the true and Ultime Operations of *Heat* are not attained. But if *Bodies* may be altered by *Heat*, and yet no ſuch Reciprocation of *Rarefaction*, and of *Condenſation*, and of *Separation*, admitted; then it is like that this *Proteus* of *Matter*, being held by the Sleeves, will turne and change into many *Metamorphoſes*. Take therefore a *Square Veſſell* of *Iron*, in forme of a Cube, and let it have good thicke and ſtrong Sides. Put into it a Cube of *Wood*, that may fill it as cloſe as may be; And let it have a Cover of Iron, as ſtrong (at leaſt) as the Sides; And let it be well Luted, after the manner of the *Chymiſts*. Then place the *Veſſell* within burning *Coales*, kept quicke kindled, for ſome few houres ſpace. Then take the *Veſſell* from the *Fire*, and take off the Cover, and ſee what is become of the *Wood*. I conceive that ſince all *Inflammation*, and *Evaporation* are utterly prohibited, and the *Body* ſtill turned upon it Selfe, that one of theſe two Effects will follow: Either that the *Body* of the *Wood* will be turned into a kinde of *Amalagma*, (as the *Chymiſts* call it;) Or that the Finer Part will be turned into *Aire*, and the Groſſer ſticke as it were baked, and incruſtate upon the Sides of the *Veſſell*; being become of a Denſer Matter, than the *Wood* it ſelfe, Crude. And for another Triall, take alſo *Water*, and put it in the like Veſſell, ſtopped as before; But uſe a gentler *Heat*, and remove the Veſſell ſometimes from the Fire; And againe, after ſome ſmall time, when it is Cold, renew the *Heating* of it: And repeat this *Alteration* ſome few times: And if you can once bring to paſſe, that the *Water*, which is one of the Simpleſt of Bodies, be changed in Colour, Odour, or Taſte, after the manner of Compound Bodies, you may be ſure that there is a great Worke wrought in Nature, and a Notable Entrance made into ſtrange Changes of Bodies, and productions: And alſo a Way made, to doe that by Fire, in ſmall time, which the Sunne and Age doe in long time. But of the Admirable Effects of this *Diſtillation in Cloſe*, (for ſo we call it) which is like the *Wombes* and *Matrices* of living creatures, where nothing Expireth, nor Separateth; We will ſpeake fully, in the due place; Not that we Aime at the making of *Paracelſus Pigmey's*; Or any ſuch Prodigious Follies; But that we know the Effects of *Heat* will be ſuch, as will ſcarce fall under the Conceit of Man; If the force of it bee altogether kept in.

Experiment Solitary touching the *Impossibility* of *Annihilation.*

100

THere is nothing more Certain in Nature, than that it is impossible for any *Body*, to be utterly *Annihilated*; But that, as it was the worke of the Omnipotency of *God*, to make *Somewhat* of *Nothing*; So it requireth the like Omnipotency, to turne *Somewhat* into *Nothing*. And therefore it is well said, by an Obscure Writer of the *Sect* of the *Chymists*; That there is no such way to effect the Strange *Transmutations* of *Bodies*; as to endevour and urge by all meanes, the *Reducing* of them to *Nothing*. And herein is contained also a great Secret of Preservation of Bodies from Change; For if you can prohibit, that they neither turne into *Aire*, because no *Aire* commeth to them; Nor goe into the *Bodies Adjacent*, because they are utterly Heterogeneall; Nor make a *Round* and *Circulation* within themselves; they will never change, though they be in their Nature never so Perishable, or Mutable. Wee see, how *Flies*, and *Spiders*, and the like; get a *Sepulcher* in *Amber*, more Durable, than the *Monument*; and *Embalming* of the *Body* of any *King*. And I conceive the like will bee of *Bodies* put into *Quick-silver*. But then they must be but thinne; As a lease, or a peece of Paper, or Parchment; For if they have a greater Crassitude, they will alter in their own Body, though they spend not. But of this, Wee shall speake more, when we handle the *Title* of *Conservation* of *Bodies*.

NA-

NATVRALL HISTORIE.

II. Century.

MUSICKE in the *Practice*, hath beene well purſued; And in good Varietie; But in the *Theory*, and eſpecially in the *Teelding* of the *Cauſes* of the *Practique*, very weakly; being reduced into certaine Myſticall Subtilties, of no uſe, and not much Truth. We ſhall therefore, after our manner, joyne the *Contemplative* and *Active Part* together.

Experiments in Conſort touching *Muſicke*.

101 All *Sounds*, are either *Muſicall Sounds*, which we call *Tones*; Whereunto there may be an *Harmony*; which *Sounds* are ever *Equall*; As *Singing*, the *Sounds of Stringed*, and *Wind-Inſtruments*, the *Ringing of Bels*, &c. Or *Immuſicall Sounds*; which are ever *Vnequall*; Such as are the *Voyce in Speaking*, all *Whiſperings*, all *Voyces of Beaſts, and Birds*, (except they bee *Singing Birds*;) all *Percuſsions*, of *Stones*, *Wood*, *Parchment*, *Skins*, (as in *Drummes*;) and infinite others.

102 The *Sounds* that produce *Tones*, are ever from ſuch *Bodies*, as are in their Parts and Pores *Equall*; As well as the *Sounds* themſelves are *Equall*; And ſuch are the *Percuſsions* of *Metall*, as in *Bels*; Of *Glaſſe*, as in the Fillipping of a *Drinking Glaſſe*; Of *Aire*, as in *Mens voices whileſt they Sing*, in *Pipes*, *Whiſtles*, *Organs*, *Stringed Inſtruments*, &c. And of *Water*, as in the *Nightingale Pipes* of *Regalls*, or *Organs*, and other *Hydraulicks*; which the *Ancients* had, and *Nero* did ſo much eſteeme, but are now loſt. And if any Man think, that the *String* of the *Bow*, and the *String* of the *Viall*, are neither of them *Equall Bodies*; And yet produce *Tones*; he is in an error. For the *Sound* is not created betweene the *Bow* or *Plectrum*, and the *String*; But between the *String* and the *Aire*; No more than it is between the *Finger* or *Quill*, and the *String*, in other *Inſtruments*. So there are (in effect) but three *Percuſsions* that

create *Tones*; *Percussions* of *Metals*, (comprehending *Glasse*, and the like;) *Percussions* of *Aire*; and *Percussions* of *Water*.

103 The *Diapason* or *Eight* in *Musick* is the sweetest *Concord*; In so much, as it is in effect an *Vnison*; As we see in *Lutes*, that are strung in the Base *Strings* with two strings, one an *Eight* above another; which make but as one *Sound*. And every *Eight Note* in Ascent, (as from *Eight* to *Fifteene*, from *Fifteene* to *twenty two*, and so *in infinitum*,) are but *Scales of Diapason*. The *Cause* is darke, and hath not been rendred by any; And therefore would be better contemplated. It seemeth that Aire, (which is the Subject of *Sounds*) in *Sounds* that are not *Tones*, (which are all *unequall*, as hath been said) admitteth much Varietie; As wee see in the *Voyces* of *Living Creatures*; And likewise in the *Voyces* of severall *Men*; (for we are capable to discerne severall *Men* by their *Voyces*;) And in the *Conjugation of Letters*, whence *Articulate Sounds* proceed; Which of all others are most various. But in the Sounds which wee call *Tones*, (that are ever *Equall*) the *Aire* is not able to cast it selfe into any such varietie; But is forced to recurre into one and the same Posture or Figure, onely differing in Greatnesse and Smalnesse. So we see *Figures* may be made of lines, Crooked and Straight, in infinite Varietie, where there is Inequality; But *Circles*, or *Squares*, or *Triangles Equilaterall*, (which are all *Figures*, of Equall lines) can differ but in Greater, or Lesser.

104 It is to be noted (the rather lest any Man should thinke, that there is any thing in this *Number* of *Eight*, to create the *Diapason*,) that this Computation of *Eight*, is a thing rather received, than any true Computation. For a true Computation ought ever to bee, by Distribution into equall Portions. Now there be intervenient in the *Rise* of *Eight* (in *Tones*) two *Beemolls*, or *Halfe-notes*; So as if you divide the *Tones* equally, the *Eight* is but *Seven* whole and equall *Notes*; And if you subdivide that into *Halfe Notes*, (as it is in the Stops of a *Lute*,) it maketh the *Number* of *thirteene*.

105 Yet this is true; That in the ordinary Rises and Fals of the *Voyce* of *Man*, (not measuring the *Tone* by whole Notes, and halfe Notes, which is the Equall Measure;) there fall out to bee two Beemols (as hath beene said) betweene the *Vnison* and the *Diapason*: And this Varying is naturall. For if a Man would endevour to raise or fall his *Voyce*, still by *Halfe-Notes*, like the Stops of a *Lute*; or by whole *Notes* alone, without *Halfes*; as farre as an *Eight*; hee will not be able to frame his *Voyce* unto it. Which sheweth, that after every three whole *Notes* Nature requireth, for all Harmonicall use, one *halfe Note* to be interposed.

106 It is to bee considered, that whatsoever Vertue is in *Numbers*, for Conducing to Concent of *Notes*, is rather to bee ascribed to the *Ante-number*, than to the *Entire Number*; As namely, that the Sound returneth after *Six*, or after *Twelve*; So that the *Seventh*, or the *Thirteenth* is not the Matter, but the *Sixth*, or the *Twelfth*; And the *Seventh* and the *Thirteenth* are but the limits and Boundaries of the *returne*.

107 The *Concords* in *Musicke* which are *Perfect*, or *Semiperfect*, betweene the *Vnison*, and the *Diapason*, are the *Fifth*, which is the most *Perfect*; the *Third* next; And the *Sixth* which is more harsh: And as the Ancients esteemed, and so doe my selfe and some Other yet, the *Fourth* which they call *Diatesseron*. As for the *Tenth*, *Twelfth*, *Thirteenth*, and so *in Infinitum*; they be but *Recurrences* of the Former; viz. of the *Third*, the *Fifth*, and the *Sixth*; being an *Eight* respectively from them.

108 For *Discords*, the *Second*, and the *Seventh*, are of all others the most odious, in *Harmony*, to the *Sense*; whereof the One is next above the *Vnison*, the

Other

Other next under the *Diapason*: which may shew, that *Harmony* requireth a competent distance of *Notes*.

In *Harmony*, if there be not a *Discord* to the *Base*, it doth not disturbe the *Harmony*, though there be a *Discord* to the *Higher Parts*; So the *Discord* be not of the Two that are Odious; And therefore the ordinary *Concent* of *Foure Parts* consisteth of an *Eight*, a *Fifth*, and a *Third* to the *Base*: But that *Fifth* is a *Fourth* to the *Treble*, and the *Third* is a *Sixth*. And the *Cause* is, for that the *Base* striking more Aire, doth overcome and drowne the *Treble*, (unlesse the *Discord* be very Odious;) And so hideth a small Imperfection. For wee see, that in one of the *lower Strings* of a *Lute*, there soundeth not the Sound of the *Treble*, nor any *Mixt Sound*, but onely the *Sound* of the *Base*. 109

Wee have no *Musick* of *Quarter-Notes*; And it may be, they are not capable of *Harmony*; For we see the *Halfe-Notes* themselves doe but interpose sometimes. Nevertheless we have some *Slides* or *Relishes*, of the Voyce, or Strings, as it were continued without *Notes*, from one *Tone* to another, rising or falling, which are delightfull. 110

The Causes of that which is *Pleasing*, or *Ingrate* to the *Hearing*, may receive light by that, which is *Pleasing* or *Ingrate* to the *Sight*. There bee two Things Pleasing to the Sight (leaving *Pictures*, and *Shapes* aside, which are but Secondary Objects; And please or displease but in Memory;) these two are, *Colours*, and *Order*. The pleasing of *Colour* symbolizeth with the *Pleasing* of any *Single Tone* to the *Eare*; But the Pleasing of *Order* doth symbolize with *Harmony*. And therefore we see in *Garden-knots*, and the *Frets of Houses*, and all equall and well-answering *Figures*, (as *Globes*, *Pyramides*, *Cones*, *Cylenders*, &c.) how they please; whereas *unequall Figures* are but Deformities. And both these *Pleasures*, that of the *Eye*, and that of the *Eare*, are but the Effects of *Equalitie*, *Good Proportion*, or *Correspondence*: So that (out of *Question*) *Equalitie*, and *Correspondence*, are the *Causes* of *Harmony*. But to finde the *Proportion* of that *Correspondence*, is more abstruse; whereof notwithstanding we shall speake somewhat, (when we handle *Tones*,) in the generall Enquiry of *Sounds*. 111

Tones are not so apt altogether to procure *Sleep*, as some other *Sounds*; As the *Wind*, the *Purling of Water*, *Humming of Bees*, a *Sweet Voyce* of one that readeth, &c. The *Cause* whereof is, for that *Tones*, because they are Equall, and slide not, doe more strike and erect the Sense, than the other. And Overmuch Attention hindreth *Sleep*. 112

There bee in *Musick* certaine *Figures*, or *Tropes*; almost agreeing with the *Figures* of *Rhetorick*; And with the *Affections* of the *Minde*, and other *Senses*. First, the *Division* and *Quavering*, which please so much in *Musick*, have an Agreement with the *Glittering* of *Light*; As the *Moon-Beames* playing upon a Wave. Againe, the *Falling* from a *Discord* to a *Concord*, which maketh great Sweetnesse in *Musick*, hath an Agreement with the *Affections*, which are reintegrated to the better, after some dislikes: It agreeth also with the *Taste*, which is soone glutted with that which is sweet alone. The *Sliding from the Close or Cadence*, hath an Agreement with the *Figure* in *Rhetoricke*, which they call *Præter Expectatum*; For there is a Pleasure even in *being deceived*. The *Reports*, and *Fuges*, have an Agreement with the *Figures* in *Rhetorick*, of *Repetition*, and *Traduction*. The *Tripla's*, and *Changing of times*, have an Agreement with the *Changes of Motions*; As when *Galliard Time*, and *Measure Time*, are in the *Medley* of one *Dance*. 113

It hath beene anciently held, and observed, that the *Sense of Hearing*, and the *Kindes of Musick*, have most Operation upon *Manners*; As to Incourage Men, 114

Men, and make them warlike; To make them Soft and Effeminate; To make them Grave; To make them Light; To make them Gentle and inclin'd to Pitty, &c. The *Cause* is, for that the *Sense of Hearing* striketh the *Spirits* more immediately, than the other *Senses*; And more incorporeally than the *Smelling*: For the *Sight*, *Taste*, and *Feeling*, have their Organs, not of so present and immediate Accesse to the *Spirits*, as the *Hearing* hath. And as for the *Smelling*, (which indeed worketh also immediatly upon the *Spirits*, and is forcible while the Object remaineth,) it is with a communication of the Breath, or Vapour of the *Object Odorate*: But *Harmony* entring easily, and Mingling not at all, and Comming with a manifest Motion; doth by Custome of often Affecting the *Spirits*, and Putting them into one kinde of Posture, alter not a little the Nature of the *Spirits*, even when the Object is removed. And therefore we see, that *Tunes* and *Aires*, even in their owne Nature, have in themselves some Affinitie with the *Affections*; As there bee *Merry Tunes*, *Dolefull Tunes*, *Solemne Tunes*; *Tunes inclining Mens mindes to Pitty*; *Warlike Tunes*; &c. So as it is no Marvell, if they alter the *Spirits*; considering that *Tunes* have a Predisposition to the *Motion* of the *Spirits* in themselves. But yet it hath beene noted, that though this variety of *Tunes*, doth dispose the *Spirits* to variety of Passions, conforme unto them; yet generally, *Musick* feedeth that disposition of the *Spirits* which it findeth. Wee see also that severall *Aires*, and *Tunes*, doe please severall *Nations*, and *Persons*, according to the Sympathy they have with their *Spirits*.

Experiments in Consort touching *Sounds*; and first touching the *Nullity*, and *Entity* of *Sounds*.

Perspective hath beene with some diligence inquired; And so hath the *Nature of Sounds*, in some sort, as farre as concerneth *Musick*. But the *Nature of Sounds* in generall, hath beene superficially observed. It is one of the subtillest Peeces of Nature. And besides, I practise, as I doe advise; which is, after long Inquiry of Things, Immerse in Matter, to interpose some Subject, which is Immateriate, or lesse Materiate; Such as this of *Sounds*; To the end, that the *Intellect* may be Rectified, and become not Partiall.

115 It is first to be considered, what *Great Motions* there are in Nature, which passe without *Sound*, or *Noise*. The *Heavens* turne about, in a most rapide Motion, without *Noise* to us perceived; Though in some *Dreames* they have beene said to make an excellent *Musick*. So the *Motions* of the *Comets*, and *Fiery Meteors* (as *Stella Cadens*, &c.) yeeld no *Noise*. And if it be thought, that it is the Greatnesse of distance from us, whereby the *Sound* cannot be heard; We see that *Lightnings*, and *Coruscations*, which are neare at hand, yeeld no *Sound* neither. And yet in all these, there is a Percussion and Division of the *Aire*. The *Windes* in the *Vpper Region* (which move the *Clouds* above (which we call the *Racke*) and are not perceived below) passe without *Noise*. The *lower Windes* in a Plaine, except they be strong, make no *Noise*; But amongst Trees, the *Noise*, of such *Windes* will be perceived. And the *Windes* (generally) when they make a *Noise*, doe ever make it unequally, Rising and Falling, and sometimes (when they are vehement,) Trembling at the Height of their Blast. *Raine*, or *Haile* falling, (though vehemently,) yeeldeth no *Noise*, in passing through the *Aire*, till it fall upon the Ground, Water, Houses, or the like. *Water* in a *River* (though a swift Streame) is not heard in the Channell,

but

but runneth in Silence, if it be of any depth; But the very *Streame* upon *Shallowes*, of Gravell, or Pebble, will be heard. And *Waters*, when they beat upon the Shore, or are straitned, (as in the falls of Bridges ;) Or are dashed against themselves, by *Windes*, give a Roaring *Noise*. Any *peece of Timber*, or *Hard Body*, being thrust forwards by another Body Contiguous, without knocking, giveth no *Noise*. And so *Bodies* in weighing, one upon another, though the *upper Body* presse the *lower Body* downe, make no *Noise*. So the *Motion* in the *Minute Parts* of any *Solide Body*, (which is the Principall Cause of *Violent Motion*, though unobserved ;) passeth without *Sound*; For that *Sound*, that is heard sometimes, is produced onely by the Breaking of the *Aire*; And not by the Impulsion of the Parts. So it is manifest ; That where the Anteriour Body giveth way, as fast as the Posteriour commeth on, it maketh no *Noise*; be the *Motion* never so great, or swift.

116 *Aire open*, and at *large*, maketh no *Noise*, except it bee sharply percussed; As in the *Sound* of a String, where *Aire* is percussed by a hard, and stiffe Body ; And with a sharp loose ; For if the String be not strained, it maketh no *Noise*. But where the *Aire is pent*, and straitned, there Breath, or other Blowing, (which carry but a gentle Percussion,) suffice to create *Sound*; As in *Pipes*, and *Winde-Instruments*. But then you must note, that in *Recorders*, which goe with a gentle Breath, the *Concave* of the *Pipe*, were it not for the *Fipple*, that straitneth the Aire, (much more than the *Simple Concave* ;) would yeeld no *Sound*. For as for other *Winde-Instruments*, they require a forcible Breath ; As *Trumpets*, *Cornets*, *Hunters-Hornes*, &c. Which appeareth by the blowne Cheeks of him that windeth them. *Organs* also are blowne with a strong winde, by the Bellowes. And note againe, that some kinde of *Wind-Instruments*, are blowne at a small Hole in the side, which straitneth the Breath at the first Entrance ; The rather, in respect of their *Traverse*, and *Stop* above the Hole, which performeth the *Fipples* Part ; As it is seene in *Flutes*, and *Fifes*, which will not give *Sound*, by a Blast at the end, as *Recorders*, &c. doe. Likewise in all *Whistling*, you contract the Mouth ; And to make it more sharpe, Men sometimes use their Finger. But in *Open Aire*, if you throw a Stone, or a Dart, they give no *Sound* : No more doe *Bullets*, except they happen to be a little hollowed in the Casting; Which Hollownesse penneth the *Aire* : Nor yet *Arrowes*, except they bee ruffled in their Feathers, which likewise penneth the *Aire*. As for *Small Whistles*, or *Shepheards Oaten Pipes* ; they give a *Sound*, because of their extreme Slendernesse, whereby the *Aire* is more pent, than in a Wider *Pipe*. Againe, the *Voyces* of *Men*, and Living Creatures, passe through the throat, which penneth the Breath. As for the *Iewes Harpe*, it is a sharp Percussion ; And besides, hath the vantage of penning the *Aire* in the Mouth.

117 *Solide Bodies*, if they be *very softly percussed*, give no *Sound* ; As when a Man treadeth very softly upon *Boards*. So *Chests* or *Doores* in faire weather, when they open easily, give no *Sound*. And *Cart-Wheeles* squeak not when they are liquoured.

118 The *Flame of Tapers*, or *Candles*, though it be a swift Motion, and breaketh the *Aire*, yet passeth without *Sound*. *Aire in Ovens*, though (no doubt) it doth (as it were) boyle, and dilate it self, and is repercussed; yet it is without *Noise*.

119 *Flame percussed by Aire*, giveth a *Noise* ; As in blowing of the Fire by Bellowes ; Greater, than if the Bellowes should blow upon the *Aire* it selfe. And so likewise *Flame Percussing the Aire strongly*, (as when Flame suddenly taketh and openeth,) giveth a *Noise* ; So, Great *Flames*, whiles the one impelleth the other, give a bellowing *Sound*.

There

120 There is a Conceit tunneth abroad, that there ſhould be a *white Powder*, which will diſcharge a Peece without *Noiſe*; which is a dangerous Experiment, if it ſhould be true: For it may cauſe ſecret Murthers. But it ſeemeth to me unpoſſible; For, if the *Aire pent*, be driven forth, and ſtrike the *Aire open*, it will certainly make a *Noiſe*. As for the *white Powder*, (if any ſuch thing bee, that may extinguiſh, or dead the *Noiſe*,) it is like to bee a Mixture of *Petre*, and *Sulphur*, without *Coale*. For *Petre* alone will not take Fire. And if any Man thinke, that the *Sound* may bee extinguiſhed, or deaded, by diſcharging the *Pent Aire*, before it commeth to the *Mouth* of the *Peece*, and to the *Open Aire*; That is not probable; For it will make more divided *Sounds*: As if you ſhould make a Croſſe Barrell hollow, thorow the Barrell of a Peece, it may be, it would give ſeverall Sounds, both at the Noſe, and at the Sides. But I conceive, that if it were poſſible, to bring to paſſe, that there ſhould be no *Aire* pent at the Mouth of the Peece, the Bullet might flie with ſmall, or no *Noiſe*. For firſt it is certaine, there is no *Noiſe* in the Percuſſion of the *Flame* upon the *Bullet*. Next the *Bullet*, in piercing thorow the *Aire*, maketh no *Noiſe*; As hath beene ſaid. And then, if there be no *Pent Aire*, that ſtriketh upon *Open Aire*, there is no Cauſe of *Noiſe*; And yet the Flying of the *Bullet* will not be ſtayed. For that *Motion* (as hath been oft ſaid) is in the Parts of the *Bullet*, and not in the *Aire*. So as triall muſt bee made by taking ſome ſmall *Concave* of *Metall*, no more than you meane to fill with Powder; And laying the Bullet in the Mouth of it, halfe out into the *Open Aire*.

121 I heard it affirmed by a Man, that was a great Dealer in Secrets, but hee was but vaine; That there was a *Conſpiracy* (which himſelfe hindred,) to have killed *Queene Mary*, Siſter to *Queen Elizabeth*, by a *Burning Glaſſe*, when ſhee walked in *Saint Iames* Parke, from the Leads of the Houſe. But thus much (no doubt) is true; That if *Burning Glaſſes* could bee brought to a great ſtrength, (as they talke generally of *Burning-Glaſſes*, that are able to burne a *Navy*,) the *Percuſſion* of the *Aire* alone, by ſuch a *Burning-Glaſſe* would make no *Noiſe*; No more than is found in *Corruſcations*, and *Lightnings*, without *Thunders*.

122 I ſuppoſe, that *Impreſſion* of the *Aire* with *Sounds*, asketh a time to bee conveighed to the *Senſe*; As well as the *Impreſſion* of *Species viſible*. Or elſe they will not be heard. And therefore, as the Bullet *moveth* ſo *ſwift*, that it is *Inviſible*; So the ſame *Swiftneſſe* of *Motion* maketh it *Inaudible*: For wee ſee, that the Apprehenſion of the *Eye*, is quicker than that of the *Eare*.

123 All *Eruptions* of *Aire*, though ſmall and ſlight, give an *Entitie of Sound*; which we call *Crackling*, *Puffing*, *Spitting*, &c. As in *Bay-ſalt*, and *Bay-leaves*, caſt into the Fire; So in *Cheſnuts*, when they leap forth of the Aſhes; So in *Greene Wood* laid upon the Fire, eſpecially *Roots*; So in *Candles* that ſpit Flame, if they be wet; So in *Raſping*, *Sneezing*, &c. So in a *Roſe-leaſe* gathered together into the faſhion of a Purſe, and broken upon the Forehead, or Backe of the Hand, as Children uſe.

Experiments in Conſort touching *Production*, *Conſervation*, and *Delatio of Sounds*; And the *Office* of the *Aire* therein.

124 THe *Cauſe* given of *Sound*, that it ſhould be an *Eliſion* of the *Aire* (whereby, if they meane any thing, they meane a *Cutting*, or *Dividing*, or elſe an *Attenuating* of the *Aire*) is but a Terme of Ignorance: And the Motion is but a Catch of the Wit upon a few Inſtances; As the Manner is in the *Philoſophy* Received. And it is common with Men, that if they have gotten a Pretty *Expreſſion*, by a *Word of Art*, that *Expreſſion* goeth currant; though it be empty of *Matter*. This Conceit of *Eliſion*, appeareth moſt manifeſtly

to

to be false, in that the *Sound* of a *Bell*, *String*, or the like, continueth melting, sometime, after the *Percussion*; But ceaseth straight-wayes, if the *Bell*, or *String*, be touched and stayed: whereas, if it were the *Elision* of the *Aire*, that made the *Sound*, it could not bee, that the Touch of the *Bell*, or *String*, should extinguish so suddenly that Motion, caused by the *Elision* of the *Aire*. This appeareth yet more manifestly, by *Chiming* with a Hammer, upon the Out-side of a *Bell*; For the *Sound* will be according to the inward Concave of the *Bell*; whereas the *Elision*, or *Attenuation* of the *Aire*, cannot be but onely betweene the *Hammer*, and the Out-side of the *Bell*. So againe, if it were an *Elision*, a broad *Hammer*, and a *Bodkin*, struck upon Metall, would give a divers *Tone*; As well as a divers *Loudnesse*: But they doe not so; For though the *Sound* of the one be *Louder*, and of the other *Softer*, yet the *Tone* is the same. Besides, in *Eccho's* (whereof some are as loud as the *Originall Voice*,) there is no new *Elision*, but a *Repercussion* onely. But that which convinceth it most of all, is; that *Sounds* are generated, where there is no *Aire* at all. But these and the like Conceits, when Men have cleared their understanding, by the light of Experience, will scatter, and breake up like a Mist.

It is certaine, that *Sound* is not produced at the first, but with some *Locall Motion* of the *Aire*, or *Flame*, or some other *Medium*; Nor yet without some *Resistance*, either in the *Aire*, or the *Body Percussed*. For if there be a meere Yeelding, or Cession, it produceth no *Sound*; As hath beene said. And therein *Sounds* differ from *Light*, and *Colours*; which passe thorow the *Aire*, or other *Bodies*, without any *Locall Motion* of the *Aire*; either at the first, or after. But you must attentively distinguish, between the *Locall Motion* of the *Aire*, (which is but *Vehiculum Causæ*, *A Carrier of the Sounds*,) and the *Sounds* themselves, Conveighed in the *Aire*. For as to the former, we see manifestly, that no *Sound* is produced (no not by *Aire* it selfe against other *Aire*, as in *Organs*, &c.) but with a perceptible *Blast* of the *Aire*; And with some *Resistance* of the *Aire* strucken. For even all *Speech*, (which is one of the gentlest *Motions* of *Aire*,) is with *Expulsion* of a little *Breath*. And all *Pipes* have a Blast, as well as a *Sound*. We see also manifestly, that *Sounds* are carried with *Wind*: And therefore *Sounds* will be heard further with the *Wind*, than against the *Wind*; And likewise doe rise and fall with the Intension or Remission of the *Wind*. But for the *Impression* of the *Sound*, it is quite another Thing; And is utterly without any *Locall Motion* of the *Aire*, Perceptible; And in that resembleth the *Species Visible*: For after a *Man* hath lured, or a *Bell* is rung, we cannot discerne any *Perceptible Motion* (at all) in the *Aire*, along as the *Sound* goeth; but onely at the first. Neither doth the *Wind* (as farre as it carryeth a *Voice*,) with the *Motion* thereof, confound any of the Delicate, and Articulate Figurations of the *Aire*, in Varietie of Words. And if a *Man* speake a good loudnesse, against the *Flame* of a *Candle*, it will not make it tremble much; though most, when those *Letters* are pronounced, which contract the Mouth; As *F*, *S*, *V*, and some others. But *Gentle Breathing*, or *Blowing* without *speaking*, will move the *Candle* farre more. And it is the more probable, that *Sound* is without any *Locall Motion* of the *Aire*, because as it differeth from the *Sight*, in that it needeth a *Locall Motion* of the *Aire* at first; So it paralleleth in so many other things with the *Sight*, and *Radiation* of *Things visible*; Which (without all question) induce no *Locall Motion* in the *Aire*, as hath beene said. 125

Nevertheless it is true, that upon the *Noise* of *Thunder*, and great *Ordnance*; Glasse windowes will shake; and Fishes are thought to bee frayed with 126

with the Motion, caused by *Noise* upon the water. But these Effects are from the Locall Motion of the *Aire*, which is a Concomitant of the *Sound*, (as hath beene said;) and not from the *Sound*.

127 It hath beene anciently reported, and is still received, that *Extreme Applauses*, and *Shouting of People* assembled in great Multitudes, have so rarified, and broken the Aire, that *Birds* flying over, have fallen downe, the Aire being not able to support them. And it is beleeved by some, that *Great Ringing of Bells* in populous Cities, hath chased away *Thunder*: and also dissipated Pestilent Aire: All which may bee also from the Concussion of the Aire, and not from the *Sound*.

128 A very great *Sound*, neare hand, hath strucken many *Deafe*; And at the Instant they have found, as it were, the breaking of a Skin or Parchment in their Eare: And my Selfe standing neare one that *Lured* loud, and shrill, had suddenly an Offence, as if somewhat had broken, or beene dislocated in my *Eare*; And immediately after, a *loud Ringing*; (Not an ordinary Singing, or Hissing, but farre louder, and differing;) so as I feared some *Deafenesse*. But after some halfe Quarter of an Houre it vanished. This Effect may be truly referred unto the *Sound*: For (as is commonly received) an *over-potent Object* doth destroy the *Sense*; And *Spirituall Species*; (both *Visible* and *Audible*,) will worke upon the Sensories, though they move not any other Body.

129 In *Delation of Sounds*, the *Enclosure* of them preserveth them, and causeth them to be heard further. And we find in Rowles of Parchment, or Truncks, the Mouth being laid to the one end of the Rowle of Parchment, or Trunk, and the *Eare* to the other, the *Sound* is heard much further, than in the *Open Aire*. The *Cause* is, for that the *Sound* spendeth, and is dissipated in the *Open Aire*; But in such Concaves it is conserved, and contracted. So also in a Peece of Ordnance, if you speake in the Touch-hole, and another lay his *Eare* to the Mouth of the Peece, the *Sound* passeth, and is farre better heard, than in the *Open Aire*.

130 It is further to be considered, how it proveth and worketh, when the *Sound* is not enclosed all the Length of his Way, but passeth partly through open Aire; As where you *speake* some distance from a *Truncke*; or where the *Eare* is some distance from the *Truncke*, at the other End; Or where both *Mouth* and *Eare* are distant from the *Truncke*. And it is tried, that in a long *Truncke*, of some eight or tenne foot, the *Sound* is holpen, though both the *Mouth*, and the *Eare* be a handfull, or more, from the Ends of the *Truncke*; And somewhat more holpen, when the *Eare* of the *Hearer* is neare, than when the *Mouth* of the *Speaker*. And it is certaine, that the *Voice* is better heard in a *Chamber* from *abroad*, than *abroad* from within the *Chamber*.

131 As the *Enclosure*, that is *Round about and Entire*, preserveth the *Sound*; So doth a *Semi-Concave*, though in a lesse degree. And therefore, if you divide a *Truncke*, or a *Cane* into two, and one speake at the one end, and you lay your Eare at the other, it will carry the *Voyce* further, than in the *Aire* at large. Nay further, if it be not a full *Semi-Concave*; but if you doe the like upon the *Mast* of a *Ship*, or a *long Pole*, or a *Peece of Ordnance* (though one speake upon the Surface of the *Ordnance*, and not at any of the Bores;) the *Voice* will be heard further, than in the Aire at large.

132 It would bee tried, how, and with what proportion of disadvantage, the *Voyce* will be carried in an *Horne*, which is a line Arched; Or in a *Trumpet*, which is a line Retorted; Or in some *Pipe* that were Sinuous.

It

It is certaine, (howſoever it croſſe the Received Opinion) that *Sounds* may be created without *Aire*, though *Aire* be the moſt favourable *Deferent* of *Sounds*. Take a *Veſſell* of *Water*, and knap a paire of Tongs ſome depth within the Water, and you ſhall heare the *Sound* of the Tongs well, and not much diminiſhed; And yet there is no *Aire* at all preſent. 133

Take one *Veſſell* of *Silver*, and another of *Wood*, and fill each of them full of Water, and then knap the Tongs together, as before, about an handfull from the Bottome, and you ſhall finde the *Sound* much more Reſounding from the *Veſſell* of *Silver*, than from that of *Wood*: And yet if there be no water in the *Veſſell*, ſo that you knap the Tongs in the *Aire*, you ſhall finde no difference, betweene the *Silver* and the *Wodden Veſſell*. Whereby, beſide the maine point of creating *Sound* without *Aire*, you may collect two Things: The one, that the *Sound* communicateth with the Bottome of the *Veſſell*: The other, that ſuch a Communication paſſeth farre better, thorow *Water* than *Aire*. 134

Strike any *Hard Bodies* together, in the midſt of a *Flame*, and you ſhall heare the *Sound* with little difference, from the *Sound* in the *Aire*. 135

The *Pneumaticall Part*, which is in all *Tangible Bodies*, and hath ſome Affinity with the *Aire*; performeth, in ſome degree, the Parts of the *Aire*; As when you knock upon an *Empty Barrell*, the *Sound* is (in part) created by the *Aire* on the Out-ſide; And (in part) by the *Aire* in the Inſide; For the *Sound* will be greater or leſſer, as the Barrell is more Empty, or more Full; But yet the *Sound* participateth alſo with the *Spirit* in the *Wood*, thorow which it paſſeth, from the Out-ſide to the Inſide: And ſo it commeth to paſſe in the *Chiming* of *Bels*, on the Outſide; where alſo the *Sound* paſſeth to the Inſide: And a number of other like Inſtances, whereof we ſhall ſpeak more when we handle the *Communication* of *Sounds*. 136

It were extreame Groſſeneſſe to think, (as we have partly touched before, that the *Sound* in *Strings* is made, or produced, betweene the *Hand* and the *String*, or the *Quill* and the *String*, or the *Bow* and the *String*: For thoſe are but *Vehicula motus*, *Paſſages* to the *Creation* of the *Sound*; the *Sound* being produced betweene the *String* and the *Aire*; And that not by any *Impulſion* of the *Aire* from the firſt *motion* of the *String*; but by the *Returne* or *Reſult* of the *String*, which was ſtrained by the Touch, to his former Place: which *Motion* of *Reſult* is quick and ſharpe; Whereas the firſt Motion is ſoft and dull. So the *Bow* tortureth the *String* continually, and thereby holdeth it in a Continuall *Trepidation*. 137

138 Experiments in Conſort touching the *Magnitude*, and *Exility*, and *Damps* of *Sounds*.

TAke a *Trunck*, and let one whiſtle at the one End, and hold your Eare at the other, and you ſhall finde the *Sound* ſtrike ſo ſharpe, as you can ſcarce endure it. The *Cauſe* is, for that *Sound* diffuſeth it ſelfe in round, And ſo ſpendeth it Selfe; But if the *Sound*, which would ſcatter in *Open Aire*, be made to go all into a Canale; It muſt needs give greater force to the *Sound*. And ſo you may note, that *Encloſures* doe not only preſerve *Sound*, but alſo encreaſe and ſharpen it.

139

A *Hunters Horne*, being greater at one end, than at the other, doth encreaſe the *Sound* more, than if the *Horne* were all of an equall Bore. The *Cauſe* is, for that the *Aire*, and *Sound*, being firſt contracted at the leſſer End, and afterwards having more Roome to ſpread at the greater End, do dilate themſelves; And in comming out ſtrike more *Aire*; whereby the *Sound* is the Greater, and Baſer. And even *Hunters Hornes*, which are ſometimes made ſtraight, and not Oblique, are ever greater at the lower end. It would

be tried alſo in *Pipes*, being made *far larger* at the lower End: Or being made with a *Belly* towards the lower End; And then iſſuing into a ſtraight Concave againe.

140 There is in *Saint Iames's Fields*, a *Conduit* of *Brick*, unto which joyneth a *low Vault*; And at the End of that, a *Round Houſe* of Stone: And in the *Brick Conduit* there is a Window; And in the *Round Houſe* a Slit or Rift of ſome little breadth: If you cry out in the Rift, it will make a fearfull roaring at the Window. The *Cauſe* is the ſame with the former; For that all *Concaves*, that proceed from more Narrow to more Broad, do amplifie the *Sound* at the Comming out.

141 *Hawkes Bels*, that have Holes in the Sides, give a greater Ring, than if the Pellet did ſtrike upon Braſſe, in the *Open Aire*. The Cauſe is the ſame with the firſt *Inſtance* of the *Trunck*; Namely, for that the *Sound* Encloſed with the Sides of the *Bell*, commeth forth at the *Holes* unſpent, and more ſtrong.

142 In *Drums*, the Cloſeneſſe round about, that preſerveth the *Sound* from diſperſing, maketh the *Noiſe* come forth at the *Drum-Hole*, farre more loud, and ſtrong, than if you ſhould ſtrike upon the like *Skin*, extended in the Open Aire. The *Cauſe* is the ſame with the two precedent.

143 *Sounds* are better heard, and further off, in an *Evening*, or in the *Night*, than at the *Noone*, or in the *Day*. The *Cauſe* is, for that in the *Day*, when the *Aire* is more Thin, (no doubt) the *Sound* pierceth better; But when the *Aire* is more Thick (as in the *Night*) the *Sound* ſpendeth and ſpreadeth abroad leſſe: And ſo it is a Degree of *Encloſure*. As for the *Night*, it is true alſo, that the Generall Silence helpeth.

144 There be two kinds of *Reflexions* of *Sounds*; The one at *Diſtance*, which is the *Eccho*; Wherein the *Originall* is heard diſtinctly, and the *Reflexion* alſo diſtinctly; Of which we ſhall ſpeak hereafter: The other in *Concurrence*; When the *Sound* Reflecting (the *Reflexion* being neare at hand) returneth immediatly upon the *Originall*, and ſo iterateth it not, but amplifieth it. Therefore we ſee, that *Muſick* upon the Water ſoundeth more; And ſo likewiſe *Muſick* is better in Chambers Wainſcotted, than Hanged.

145 The *Strings* of a Lute, or Violl, or Virginals, doe give a farre greater *Sound*, by reaſon of the *Knot*, and *Board*, and *Concave* underneath, than if there were nothing but only the *Flat* of a *Board*, without that *Hollow* and *Knot*, to let in the Upper Aire into the Lower. The *Cauſe* is, the Communication of the Upper Aire with the Lower; And Penning of both from Expence, or Diſperſing.

146 An *Iriſh Harpe* hath Open Aire on both ſides of the *Strings*: And it hath the *Concave* or *Belly*, not along the *Strings*, but at the End of the *Strings*. It maketh a more Reſounding *Sound*, than a *Bandora*, *Orpharion*, or *Citterne*, which have likewiſe *Wire-ſtrings*. I judge the *Cauſe* to be, for that Open Aire on both Sides helpeth, ſo that there be a *Concave*; Which is therefore beſt placed at the End.

147 In a *Virginall*, when the *Lid* is downe, it maketh a more exile *Sound*, than when the *Lid* is open. The *Cauſe* is, for that all *Shutting in* of *Aire*, where there is no competent Vent, dampeth the *Sound*: Which maintaineth likewiſe the former *Inſtance*; For the *Belly* of the *Lute*, or *Violl*, doth pen the *Aire* ſomewhat.

148 There is a *Church* at *Glocester*, (and as I have heard the like is in ſome other places;) where if you ſpeak againſt a Wall, ſoftly, another ſhall heare your *Voice* better a good way off, than neare hand. Enquire more particularly of the Fame of that Place. I ſuppoſe there is ſome Vault, or

Hollow, or Isle, behinde the Wall, and some Passage to it towards the further end of that Wall, against which you speak; So as the *Voice* of him that speaketh, slideth along the Wall, and then entreth at some Passage, and communicateth with the *Aire* of the Hollow; For it is preserved somewhat by the plaine Wall; but that is too weak to give a *Sound* Audible, till it hath communicated with the back *Aire*.

Strike upon a *Bow-string*, and lay the *Horne* of the *Bow* neare your Eare, and it will encrease the *Sound*, and make a degree of a *Tone*. The *Cause* is, for that the Sensory, by reason of the Close Holding, is percussed, before the Aire disperseth. The like is, if you hold the *Horne* betwixt your Teeth. But that is a plaine *Delation* of the *Sound*; from the Teeth, to the Instrument of Hearing; For there is a great Entercourse betweene those two Parts; As appeareth by this; That a harsh *grating Tune* setteth the Teeth on edge. The like falleth out, if the *Horne* of the *Bow* be put upon the Temples; But that is but the Slide of the *Sound* from thence to the Eare. 149

If you take a *Rod* of *Iron*, or *Brasse*, and hold the one end to your Eare, and strike upon the other, it maketh a far greater *Sound*, than the like Stroke upon the *Rod*, not so made Contiguous to the Eare. By which, and by some other *Instances*, that have beene partly touched, it should appeare; That *Sounds* do not only slide upon the Surface of a Smooth Body, but doe also communicate with the Spirits, that are in the Pores of the Body. 150

I remember in *Trinity Colledge* in *Cambridge*, there was an *Vpper Chamber*, which being thought weak in the Roofe of it, was supported by a Pillar of Iron, of the bignesse of ones Arme, in the middest of the *Chamber*; which if you had struck, it would make a little flat Noise in the *Room* where it was struck; But it would make a great Bombe in the *Chamber* beneath. 151

The *Sound* which is made by *Buckets* in a *Well*, when they touch upon the *Water*; Or when they strike upon the side of the *Well*; Or when two Buckets dash the one against the other; These *Sounds* are deeper, and fuller, than if the like Percussion were made in the *Open Aire*. The *Cause* is the Penning and Enclosure of the *Aire*, in the Concave of the *Well*. 152

Barrels placed in a Roome under the Floare of a *Chamber*, make all *Noises* in the same Chamber, more full and Resounding. 153

So that there be five ways (in generall,) of Majoration of Sounds: Enclosure Simple; Enclosure with Dilatation; Communication; Reflexion Concurrent; *and* Approach *to the* Sensory.

For *Exility* of the *Voice*, or other *Sounds*: It is certaine, that the *Voice* doth passe thorow *Solid* and *Hard Bodies*, if they be not too thick. And thorow *Water*; which is likewise a very Close Body; and such an one, as letteth not in Aire. But then the *Voice*, or other *Sound*, is reduced, by such passage, to a great *Weaknesse*, or *Exility*. If therefore you stop the *Holes* of a *Hawkes Bell*, it will make no Ring, but a flat Noise, or Rattle. And so doth the *Ætites*, or *Eagles* Stone, which hath a little Stone within it. 154

And as for *Water*, it is a certaine Triall: Let a Man go into a *Bath*, and take a *Paile*, and turne the Bottome upward, and carry the Mouth of it (Even,) downe to the Levell of the *Water*, and so presse it downe under the *Water*, some handfull and an halfe, still keeping it even, that it may not tilt on either side, and so the Aire get out: Then let him that is in the *Bath*, dive with his Head so far under *Water*, as he may put his Head into the *Paile*, and there will come as much *Aire* bubling forth, as will make Roome for his Head. Then let him speak, and any that shall stand without, shall heare his *Voice* plainly; but yet made extreame sharp and exile, like the *Voice* of 155

Puppets: But yet the *Articulate Sounds* of the *Words* will not be confounded. Note that it may be much more handsomely done, if the *Paile* be put over the Mans head above Water, and then he cowre downe, and the *Paile* be pressed downe with him. Note that a Man must kneele or sit, that he may be lower than the *Water*. A Man would think, that the *Sicilian Poet* had knowledge of this *Experiment*; For he saith; That *Hercules's Page Hylas* went with a Water-pot, to fill it at a pleasant *Fountaine*, that was neare the Shore, and that the *Nymphs* of the *Fountaine* fell in love with the Boy, and pulled him under *Water*, keeping him alive; And that *Hercules* missing his *Page*, called him by his Name aloud, that all the Shore rang of it; And that *Hylas* from within the Water, answered his Master; But (that which is to the present purpose) with so small and exile a *Voice*, as *Hercules* thought he had beene three Miles off, when the *Fountaine* (indeed) was fast by.

156 In *Lutes*, and *Instruments* of *Strings*, if you stop a *String* high, (whereby it hath lesse Scope to tremble) the *Sound* is more *Treble*, but yet more dead.

157 Take two *Sawcers*, and strike the Edge of the one against the Bottome of the other, within a *Paile* of *Water*; And you shall finde, that as you put the *Sawcers* lower, and lower, the *Sound* groweth more flat; even while Part of the *Sawcer* is above the Water; But that Flatnesse of *Sound* is joyned with a harshnesse of *Sound*; which (no doubt is caused by the inequality of the *Sound*, which commeth from the Part of the *Sawcer* under the *Water*, and from the Part above. But when the *Sawcer* is wholly under the *Water*, the *Sound* becommeth more cleare, but far more low; And as if the *Sound* came from a far off.

158 A *Soft Body* dampeth the *Sound*, much more than a *Hard*: As if a Bell hath Cloth, or Silk wrapped about it, it deadeth the *Sound* more, than if it were Wood. And therefore in *Clericalls*, the Keyes are lined; And in Colledges they use to line the Tablemen.

159 Triall was made in a *Recorder*, after these severall manners. The Bottome of it was set against the Palme of the Hand; stopped with Wax round about, set against a Damask Cushion; Thrust into Sand; into Ashes; into Water, (halfe an Inch under the Water;) Close to the Bottome of a Silver Basin; And still the *Tone* remained: But the Bottome of it was set against a Wollen Carpet; A Lining of Plush; A Lock of Wooll, (though loosely put in;) Against Snow; And the sound of it was quite deaded, and but Breath.

160 *Iron* Hot produceth not so full a *Sound*, as when it is Cold; For while it is hot, it appeareth to be more Soft, and lesse Resounding. So likewise *Warme Water*, when it falleth, maketh not so full a *Sound*, as *Cold*: And I conceive it is softer, and neerer the Nature of Oile; For it is more slippery; As may be perceived, in that it scowreth better.

161 Let there be a *Recorder* made, with two Fipples, at each end one; The *Trunck* of it of the length of two *Recorders*, and the Holes answerable towards each end; And let two play the same Lesson upon it, at an Unison; And let it be noted whether the *Sound* be confounded; or amplified; or dulled. So likewise let a *Crosse* be made, of two Truncks (thorowout) hollow; And let two speak, or sing, the one long wayes, the other traverse: And let two heare at the opposite Ends; And note, whether the *Sound* be confounded; amplified; or dulled. Which two *Instances* will also give light to the *Mixture* of *Sounds*; whereof we shall speak hereafter.

162 A *Bellowes* blowne in at the *Hole* of a *Drum*, and the *Drum* then strucken, maketh

maketh the *Sound* a little flatter, but no other apparent Alteration. The *Cause* is manifest; Partly for that it hindreth the Issue of the *Sound*; And partly for that it maketh the Aire, being blowne together, lesse moveable.

Experiments in Consort touching the *Loudnesse*, or *Softnesse* of *Sounds*; and their *Carriage at longer or shorter Distance.*

THe *Loudnesse*, and *Softnesse* of *Sounds*, is a Thing distinct from the *Magnitude* and *Exilitie* of *Sounds*; For a *Base String*, though softly strucken, giveth the greater *Sound*; But a *Treble String*, if hard strucken, will be heard much further off. And the *Cause* is, for that the *Base String* striketh more Aire; And the *Treble* lesse Aire, but with a sharper Percussion.

163

It is therefore the *Strength* of the *Percussion*, that is a Principall *Cause* of the *Loudnesse* or *Softnesse* of *Sounds*: As in knocking harder or softer; Winding of a Horne stronger or weaker; Ringing of a Hand-bell harder or softer, &c. And the *Strength* of this *Percussion*, consisteth, as much, or more, in the *Hardnesse* of the *Body Percussed*, as in the *Force* of the *Body Percussing*: For if you strike against a Cloth, it will give a lesse *Sound*; If against Wood, a greater; If against Metall, yet a greater; And in Metals, if you strike against Gold, (which is the more pliant,) it giveth the flatter *Sound*; If against Silver, or Brasse, the more Ringing *Sound*. As for *Aire*, where it is strongly pent, it matcheth a *Hard Body*. And therefore wee see in discharging of a *Peece*, what a great Noise it maketh. Wee see also, that the Charge with Bullet; Or with Paper wet, and hard stopped; Or with Powder alone, rammed in hard; maketh no great difference in the *Loudnesse* of the Report.

164

The *Sharpnesse* or *Quicknesse* of the *Percussion*, is a great *Cause* of the *Loudnesse*, as well as the *Strength*: As in a Whip or Wand, if you strike the Aire with it; the Sharper and Quicker you strike it, the *Louder Sound* it giveth. And in playing upon the *Lute*, or *Virginalls*, the quicke Stroke or Touch, is a great life to the *Sound*. The *Cause* is, for that the Quicke Striking cutteth the Aire speedily; whereas the Soft Striking doth rather beat, than cut.

165

Experiments in Consort touching the *Communication* of *Sounds*.

The *Communication* of *Sounds* (as in Bellies of *Lutes*, Empty Vessells, *&c.*) hath beene touched obiter, in the *Majoration* of *Sounds*: But it is fit also to make a *Title* of it apart.

The *Experiment* for greatest Demonstration of *Communication* of *Sounds*, is the *Chiming* of *Bells*; where if you strike with a Hammer upon the Upper Part, and then upon the Midst, and then upon the Lower, you shall finde the *Sound* to be more Treble, and more Base, according unto the Concave, on the Inside; though the Percussion bee onely on the Outside.

166

When the *Sound* is created betweene the *Blast* of the *Mouth*, and the *Aire* of the *Pipe*, it hath nevertheleſſe some *Communication* with the Matter of the Sides of the *Pipe*, and the *Spirits* in them contained; for in a *Pipe*, or *Trumpet*, of Wood, and Brasse, the *Sound* will be divers; So if the *Pipe* be covered with *Cloth*, or *Silke*, it will give a divers *Sound*, from that it would doe of it selfe; So, if the *Pipe* bee a *little wet* on the *Inside*, it will make a differing *Sound*, from the same *Pipe dry*.

167

That *Sound* made within *Water*, doth communicate better with a hard Body thorow *Water*, than made in *Aire*, it doth with *Aire*; *Vide Experimentum*, 134.

168

Experiments in Consort touching *Equality*, and *Inequality* of *Sounds*.

Wee have spoken before (in the *Inquisition* touching *Musicke*,) of *Musicall Sounds*, whereunto there may be a Concord or

Discord in two Parts; Which *Sounds* we call *Tones*; And likewise of *Immusicall Sounds*; And have given the *Cause*, that the *Tone* proceedeth of *Equality*, and the other of *Inequality*. And wee have also expressed there, what are the *Equall Bodies* that give *Tones*, and what are the *Vnequall* that give none. But now we shall speake of such *Inequalitie* of *Sounds*, as proceedeth, not from the Nature of the Bodies themselves, but is Accidentall; Either from the *Roughnesse*, or *Obliquity* of the *Passage*; or from the *Doubling* of the *Percutient*; Or from the *Trepidation* of the *Motion*.

169 A *Bell*, if it have a *Rift* in it, whereby the *Sound* hath not a cleare Passage, giveth a *Hoarse* and *Iarring Sound*; So the *Voice* of *Man*, when by Cold taken the Wesill growethrugged, and (as we call it) furred, becommeth hoarse. And in these two *Instances*, the *Sounds* are Ingrate; because they are meerely *Vnequall*: But, if they be *Vnequall* in *Equality*, then the *Sound* is Gratefull, but Purling.

170 All *Instruments*, that have either *Returnes*, as Trumpets; Or *Flexions*, as Cornets; Or are *Drawne up*, and *put from*, as Sackbuts; have a *Purling Sound*: But the *Recorder*, or *Flute*, that have none of these *Inequalities*, give a cleare *Sound*. Nevertheless, the *Recorder* it selfe, or *Pipe* moistened a little in the Inside, soundeth more solemnly, and with a little Purling, or Hissing. Againe, a *Wreathed String*, such as are in the Base Strings of *Bandoraes*, giveth also a *Purling Sound*.

171 But a *Lute-string*, if it bee meerely *Vnequall* in his Parts, giveth a Harsh and Untuneable *Sound*; which *Strings* wee call *False*, being bigger in one Place than in another; And therefore *Wire-strings* are never *False*. Wee see also, that when we trie a *False Lute-string*, we use to extend it hard betweene the Fingers, and to fillip it; And if it giveth a double *Species*, it is *True*; But if it giveth a treble, or more, it is *False*.

172 *Waters*, in the *Noise* they make as they runne, represent to the Eare a *Trembling Noise*; And in *Regals*, (where they have a *Pipe*, they call the *Nightingale-Pipe*, which containeth *Water*) the *Sound* hath a continuall Trembling: And Children have also little Things they call *Cockes*, which have *Water* in them; And when they blow, or whistle in them, they yeeld a *Trembling Noise*; Which *Trembling* of *Water*, hath an affinitie with the Letter *L*. All which *Inequalities* of *Trepidation*, are rather pleasant, than otherwise.

173 All *Base Notes*, or very *Treble Notes*, give an Asper *Sound*; For that the *Base* striketh more Aire, than it can well strike equally: And the *Treble* cutteth the Aire so sharpe, as it returneth too swift, to make the *Sound* Equall: And therefore a *Meane*, or *Tenor*, is the sweetest Part.

174 We know Nothing, that can at pleasure make a *Musicall*, or *Immusicall Sound*, by voluntary *Motion*, but the *Voyce* of *Man*, and *Birds*. The *Cause* is, (no doubt) in the Weasill or Wind-Pipe, (which we call *Aspera Arteria*,) which being well extended, gatheretb *Equality*; As a Bladder that is wrinckled, if it bee extended, becommeth smooth. The Extension is alwayes more in *Tones*, than in *Speech*: Therefore the *Inward Voyce* or *Whisper* can never give a *Tone*: And in *Singing*, there is (manifestly) a greater Working and Labour of the Throat, than in *Speaking*; as appeareth in

in the Thrusting out, or Drawing in of the Chinne, when wee sing.

The *Humming* of *Bees*, is an *Vnequall Buzzing*; And is conceived, by some of the Ancients, not to come forth at their Mouth, but to bee an *Inward Sound*; But (it may be) it is neither; But from the motion of their Wings; For it is not heard but when they stirre. 175

All *Metalls quenched* in *Water*, give a Sibilation or Hissing Sound; (which hath an Affinity with the letter Z.) notwithstanding the *Sound* bee created betweene the *Water* or *Vapour*, and the *Aire*. *Seething* also, if there bee but small Store of *Water*, in a Vessell, giveth a Hissing *Sound*; But *Boyling* in a full Vessell, giveth a Bubling *Sound*, drawing somewhat neare to the *Cocks* used by Children. 176

Triall would be made, whether the *Inequality*, or Interchange of the *Medium*, will not produce an *Inequality* of *Sound*; As if three *Bells* were made one within another, and Aire betwixt each; And then the outermost *Bell* were chimed with a Hammer, how the *Sound* would differ from a Simple *Bell*. So likewise, take a *Plate* of *Brasse*, and a *Plancke* of *Wood*, and joyne them close together, and knock upon one of them, and see if they doe not give an *unequall Sound*. So make two or three *Partitions* of *Wood* in a *Hogshead*, with *Holes* or *Knots* in them; And marke the difference of their *Sound*, from the *Sound* of an *Hogshead*, without such *Partitions*. 177

Experiments in Consort touching the *more Treble*, and the *more Base Tones*, or *Musicall Sounds*.

IT is evident, that the *Percussion* of the *Greater Quantity of Aire*, causeth the *Baser Sound*; And the lesse *Quantity*, the more *Treble Sound*. The *Percussion* of the *Greater Quantity of Aire*, is produced by the *Greatnesse of the Body Percussing*; By the *Latitude* of the *Concave*, by which the *Sound* passeth; and by the *Longitude* of the same *Concave*. Therefore we see that a *Base string*, is greater than a *Treble*; A *Base Pipe* hath a greater Bore than a *Treble*; And in *Pipes*, and the like, the lower the Note Holes be, and the further off from the Mouth of the *Pipe*, the more *Base Sound* they yeeld; And the nearer the Mouth, the more *Treble*. Nay more, if you strike an *Entire Body*, as an *Andiron* of *Brasse*, at the Top, it maketh a more *Treble Sound*; And at the Bottome a *Baser*. 178

It is also evident, that the *Sharper* or *Quicker Percussion of Aire* causeth the more *Treble Sound*; And the *Slower* or *Heavier*, the more *Base Sound*. So we see in *Strings*; the more they are wound up, and strained; (And thereby give a more quick Start-backe;) the more *Treble* is the *Sound*; And the slacker they are, or lesse wound up, the *Baser* is the *Sound*. And therefore a Bigger *String* more strained, and a Lesser *String*, lesse strained, may fall into the same *Tone*. 179

Children, *Women*, *Eunuchs* have more small and shrill *Voyces*, than *Men*. The Reason is, not for that *Men* have greater Heat, which may make the *Voyce* stronger, (for the strength of a *Voyce* or *Sound*, doth make a difference in the *Loudnesse* or *Sofinesse*, but not in the *Tone*;) But from the Dilatation of the Organ; which (it is true) is likewise caused by Heat. But the Cause of *Changing* the *Voyce*, at the yeares of Puberty, is more obscure. It seemeth to be, for that when much of the Moysture of the Body, which did before irrigate the Parts, is drawne down to the Spermaticall vessels; it leaveth the Body more hot than it was; whence commeth the Dilaration of the Pipes: For we see plainly, all Effects of Heat, doe then come on; As Pilositie, more Roughnesse of the Skinne, Hardnesse of the Flesh, &c. 180

The Industry of the *Musitian*, hath produced two other Meanes of *Straining*, or *Intension* of *Strings*, besides their *Winding up*. The one is the *Stopping* 181

of

of the *String* with the *Finger*; As in the Necks of Lutes, Viols, &c. The other is the *Shortnesse* of the *String*; As in Harps, Virginalls, &c. Both these have one, and the same reason; For they cause the *String* to give a quicker Start.

182 In the *Straining* of a *String*, the further it is strained, the lesse *Superstraining* goeth to a *Note*; For it requireth good Winding of a String, before it will make any Note at all: And in the Stops of Lutes, &c. the higher they goe, the lesse Distance is betweene the Frets.

183 If you fill a *Drinking Glasse* with *Water*, (especially one Sharp below, and Wide above,) and fillip upon the Brim, or Out-side; And after empty Part of the *Water*, and so more and more, and still trie the *Tone* by Fillipping; you shall finde the *Tone* fall, and be more *Base*, as the *Glasse* is more Empty.

Experiments in Consort touching the *Proportion* of *Treble* and *Base Tones*.

The Just and Measured *Proportion* of the *Aire Percussed*, towards the *Basenesse* or *Treblenesse* of *Tones*, is one of the greatest Secrets in the Contemplation of *Sounds*. For it discovereth the true *Coincidence* of *Tones* into *Diapasons*; Which is the Returne of the same *Sound*. And so of the *Concords* and *Discords*, between the *Vnison*, and *Diapason*; Which we have touched before, in the *Experiments* of *Musicke*; but thinke fit to resume it here, as a principall Part of our Enquiry touching the *Nature* of *Sounds*. It may bee found out in the *Proportion* of the *Winding* of *Strings*; In the *Proportion* of the *Distance* of *Frets*; And in the *Proportion* of the *Concave* of *Pipes*, &c. But most commodiously in the last of these.

184 Trie therefore the *Winding* of a *String* once about, as soon as it is brought to that Extension, as will give a *Tone*; And then of twice about; And thrice about, &c. And mark the Scale or Difference of the Rise of the *Tone*: Whereby you shall discover, in one, two Effects; Both the *Proportion* of the *Sound* towards the *Dimension* of the *Winding*; And the *Proportion* likewise of the *Sound* towards the *String*, as it is more or lesse strained. But note that to measure this, the way will be, to take the Length in a right Line of the *String*, upon any Winding about of the Pegge.

185 As for the *Stops*, you are to take the *Number* of *Frets*; And principally the *Length* of the *Line*, from the first Stop of the *String*, unto such a Stop as shall produce a *Diapason* to the former Stop, upon the same *String*.

186 But it will best (as it is said) appeare, in the *Bores* of *Wind-Instruments*: And therefore cause some halfe dozen *Pipes*, to bee made, in length, and all things else, alike, with a single, double, and so on to a sextuple *Bore*; And so marke what Fall of *Tone* every one giveth. But still in these three last *Instances*, you must diligently observe, what *length* of *String*, or *Distance* of *Stop*, or *Concave* of *Aire*, maketh what *Rise* of *Sound*. As in the last of these (which (as we said) is that, which giveth the aptest demonstration,) you must set downe what Encrease of *Concave* goeth to the making of a *Note* higher; And what of two *Notes*; And what of three *Notes*; And so up to the *Diapason*: For then the great Secret of *Numbers* and *Proportions*, will appeare. It is not unlike, that those that make *Recorders*, &c. know this already: for that they make them in *Sets*. And likewise *Bell-founders* in fitting the

the tune of their *Bells*. So that Enquiry may ſave Triall. Surely, it hath been obſerved by one of the *Ancients*, that an *Empty Barrell* knocked upon with the finger, giveth a *Diapaſon* to the *Sound* of the like *Barrell full*; But how that ſhould be, I doe not well underſtand; For that the knocking of a *Barrell, full* or *Emptie*, doth ſcarce give any *Tone*.

There is required ſome ſenſible Difference in the *Proportion* of creating a *Note*, towards the *Sound* it ſelfe, which is the Paſſive: And that it bee not too neare, but at a diſtance. For in a *Recorder*, the three uppermoſt Holes, yeeld one *Tone*; which is a *Note* lower than the *Tone* of the firſt three. And the like (no doubt) is required in the Winding or Stopping of *Strings*. 187

There is another Difference of *Sounds*, which wee will call *Exteriour*, and *Interiour*. It is not *Soft*, nor *Loud*: Nor it is not *Baſe*, nor *Treble*: Nor it is not *Muſicall*, nor *Immuſicall*: Though it bee true, that there can bee no *Tone* in an *Interiour Sound*: But on the other ſide, in an *Exteriour Sound*, there may bee both *Muſicall* and *Immuſicall*. Wee ſhall therefore enumerate them, rather than preciſely diſtinguiſh them; Though (to make ſome Adumbration of that wee meane) the *Interiour* is rather an *Impulſion* or *Contuſion* of the *Aire*, than an *Eliſion* or *Section* of the ſame. So as the *Percuſſion* of the one, towards the other, differeth, as a *Blow* differeth from a *Cut*. Experiments in Conſort touching *Exteriour*, and *Interiour Sounds*

In *Speech* of *Man*, the *Whiſpering*, (which they call *Suſurrus* in *Latine*,) whether it be louder or ſofter, is an *Interiour Sound*; But the *Speaking out*, is an *Exteriour Sound*; And therefore you can never make a *Tone*, nor ſing in *Whiſpering*; But in *Speech* you may: So *Breathing*, or *Blowing* by the *Mouth*, *Bellowes*, or *Wind*, (though lowd) is an *Interiour Sound*; But the *Blowing* thorow a *Pipe*, or *Concave*, (though ſoft) is an *Exteriour*. So likewiſe the greateſt *Winds*, if they have no Coarctation, or blow not hollow, give an *Interiour Sound*; The Whiſtling or hollow *Wind* yeeldeth a Singing, or *Exteriour Sound*; The former being pent by ſome other Body; The later being pent in by his own Denſitie: And therefore we ſee, that when the *Wind* bloweth hollow, it is a Signe of Raine. The *Flame*, as it moveth within it ſelfe, or is blowne by a *Bellowes*, giveth a Murmur or *Interiour Sound*. 188

There is no *Hard Body*, but ſtrucke againſt another *Hard Body*, will yeeld an *Exteriour Sound*, greater or leſſer: In ſo much as if the Percuſſion be overſoft, it may induce a Nullity of *Sound*; But never an *Interiour Sound*; As when one treadeth ſo ſoftly, that hee is not heard. 189

Where the *Aire* is the *Percutient*, pent, or not pent, againſt a *Hard Body*, it never giveth an *Exteriour Sound*; As if you blow ſtrongly with a Bellowes againſt a Wall. 190

Sounds (both *Exteriour* and *Interiour*,) may be made, as well by *Suction*, as by *Emiſſion* of the *Breath*: As in *Whiſtling*, or *Breathing*. 191

It

Experiments in Consort touching *Articulation of Sounds.*

192 IT is evident, and it is one of the ſtrangeſt Secrets in *Sounds*, that the *whole Sound* is not in the *whole Aire* onely; But the *whole Sound* is alſo in every ſmall *Part* of the *Aire*. So that all the curious Diverſitie of *Articulate Sounds*, of the Voyce of Man, or Birds, will enter at a ſmall Cranny, Inconfuſed.

193 The *Vnequall Agitation* of the *Winds*, and the like, though they be materiall to the Carriage of the *Sounds*, further or leſſe way; yet they doe not confound the *Articulation* of them at all, within that diſtance that they can be heard; Though it may be, they make them to be heard leſſe Way, than in a Still; as hath beene partly touched.

194 Over-great Diſtance confoundeth the *Articulation* of *Sounds*; As we ſee, that you may heare the *Sound* of a Preachers voyce, or the like, when you cannot diſtinguiſh what he ſaith. And one *Articulate Sound* will confound another; as when many ſpeake at once.

195 In the *Experiment* of *Speaking under Water*, when the Voyce is reduced to ſuch an Extreme Exilitie, yet the *Articulate Sounds*, (which are the *Words*) are not confounded; as hath beene ſaid.

196 I conceive, that an *Extreme Small*, or an *Extreme Great Sound*, cannot bee *Articulate*; But that the *Articulation* requireth a *Mediocrity* of *Sound:* For that the *Extreme Small Sound* confounderh the *Articulation* by *Contracting*; And the *Great Sound*, by *Diſperſing:* And although (as was formerly ſaid) a *Sound Articulate*, already created, will be contracted into a ſmall Cranny; yet the firſt *Articulation* requireth more Dimenſion.

197 It hath beene obſerved, that in a *Roome*, or in a *Chappell*, Vaulted below, and Vaulted likewiſe in the Roofe, a Preacher cannot be heard ſo well, as in the like Places not ſo Vaulted. The Cauſe is, for that the *Subſequent Words* come on, before the *Precedent Words* vaniſh: And therefore the *Articulate Sounds* are more confuſed, though the Groſſe of the *Sound* be greater.

198 The *Motions* of the *Tongue*, *Lips*, *Throat*, *Pallat*, &c. which goe to the *Making* of the ſeverall *Alphabeticall Letters*, are worthy Enquiry, and pertinent to the preſent *Inquiſition* of *Sounds:* But becauſe they are ſubtill, and long to deſcribe, we will referre them over, and place them amongſt the *Experiments* of *Speech*. The *Hebrewes* have beene diligent in it, and have aſſigned, which *Letters* are *Labiall*, which *Dentall*, which *Gutturall*, &c. As for the *Latines*, and *Grecians*, they have diſtinguiſhed betweene *Semi-vowels*, and *Mutes*; And in *Mutes*, betweene *Mutæ Tenues*, *Mediæ*, and *Aſpiratæ*; Not amiſſe; But yet not diligently enough. For the ſpeciall *Stroakes*, and *Motions*, that create thoſe *Sounds*, they have little enquired: As that the *Letters*, *B. P. F. M.* are not expreſſed, but with the *Contracting*, or *Shutting* of the *Mouth*; That the *Letters*, *N.* and *B.* cannot bee pronounced, but that the *Letter*, *N.* will turne into *M.* As *Hecatonba*, will bee *Hecatomba*. That *M.* and *T.* cannot bee pronounced together; but *P.* will come betweene; as *Emtus*, is pronounced *Emptus*; And a Number of the like. So that if you enquire to the full; you will finde, that to the Making of the whole *Alphabet*, there will be fewer *Simple Motions* required, than there are *Letters*.

199 The *Lungs* are the moſt Spongy Part of the Body; And therefore ableſt to contract, and dilate it ſelfe; And where it contracteth it ſelfe, it expelleth the *Aire*; which thorow the *Artire*, *Throat*, and *Mouth*, maketh the *Voyce:* But yet *Articulation* is not made, but with the

the helpe of the *Tongue*, *Pallate*, and the reſt of thoſe they call *Inſtruments* of *voyce*.

There is found a Similitude, betweene the *Sound* that is made by *Inanimate Bodies*, or by *Animate Bodies*, that have no *Voyce Articulate*; and divers *Letters* of *Articulate Voyces*: And commonly Men have given ſuch Names to thoſe *Sounds*, as doe allude unto the Articulate Letters. As *Trembling* of *Water* hath Reſemblance with the *Letter L*; *Quenching* of *Hot Metalls*, with the *Letter Z*; *Snarling* of *Dogs*, with the *Letter R*; The *Noiſe* of *Scritch-Owles*; with the *Letter Sh*; *Voyce* of *Cats*, with the *Dypthong Eu*; *Voyce* of *Cuckoes*, with the *Dypthong Ou*; *Sounds* of *Strings*, with the *Letter Ng*: So that if a Man, (for Curioſity, or Strangeneſſe ſake,) would make a *Puppet* or other Dead Body, to pronounce a *Word*; Let him conſider, on the one Part, the Motion of the *Inſtruments* of *Voyce*; and on the other part the like *Sounds* made in *Inanimate Bodies*; And what Conformitie there is that cauſeth the Similitude of *Sounds*; And by that he may miniſter light to that Effect. 200

NA-

NATVRALL HISTORIE.

III. Century.

ALL *Sounds* (whatsoever) move Round; That is to say; On *all Sides*; *Vpwards*; *Downwards*; *Forwards*; and *Backwards*. This appeareth in all *Instances*.

201 Experiments in Consort, touching the *Motions* of *Sounds*, in what *Lines* they are *Circular*, *Oblique*, *Straight*; *Vpwards*, *downwards*; *Forwards*, *Backwards*.

Sounds doe not require to be conveyed to the *Sense*, in a *Right Line*, as *Visibles* doe, but may bee *Arched*; Though it be true, they move strongest in a *Right Line*; Which nevertheless is not caused by the *Rightnesse* of the *Line*, but by the Shortnesse of the distance; *Linea recta brevissima*. And therefore we see, if a *Wall* be betweene, and you speake on the one Side, you heare it on the other; Which is not because the *Sound* Passeth thorow the *Wall*; but *Archeth* over the *Wall*.

202

If the *Sound* be *Stopped* and *Repercussed*, it commeth about on the other Side, in an *Oblique Line*. So, if in a *Coach*, one side of the Boot bee downe, and the other up; And a Begger beg on the Close Side; you would thinke that he were on the Open Side. So likewise, if a *Bell* or *Clock*, bee (for Example) on the North-side of a Chamber; And the Window of that Chamber be upon the South; Hee that is in the Chamber will thinke the *Sound* came from the South.

203

Sounds, though they *spread round*, (so that there is an *Orbe*, or *Spherical Area* of the *Sound*;) yet they move strongest, and goe furthest in the *Fore-Lines*, from the first Locall Impulsion of the Aire. And therefore in *Preaching*, you shall heare the *Preachers* Voyce, better, before the Pulpit, than behind it, or on the Sides, though it stand open. So a *Harquebuz*, or *Ordinance*, will bee further heard, forwards, from the Mouth of the *Peece*, than backwards, or on the Sides.

204

It may be doubted, that *Sounds* doe move better Downwards, than Upwards. *Pulpits* are placed high above the People. And when the Ancient *Generalls* spake to their Armies, they had ever a Mount of Turfe cast up, whereupon they stood: But this may be imputed to the Stops and Obstacles, which the voyce meeteth with, when one speaketh upon the levell. But

205

there

there seemeth to be more in it: For it may be, that *Spirituall Spices*, both of *Things Visible* and *Sounds*, doe move better *Downwards* than *Vpwards*. It is a strange Thing, that to Men standing below on the Ground, those that be on the Top of Pauls, seem much lesse than they are, and cannot be knowne; But to Men above, those below seeme nothing so much lessened, and may be knowne: yet it is true, that all things to them above, seeme also somewhat contracted, and better collected into Figure: as *Knots* in *Gardens* shew best from an Vpper window, or Tarras.

206 But to make an exact Triall of it, let a Man stand in a *Chamber*, not much above the Ground, and speake out at the window, thorow a *Trunke*; to one standing on the Ground, as softly as he can, the other laying his Eare close to the *Trunke*: Then *via versa*, let the other speake *below* keeping the same Proportion of Softnesse; And let him in the *Chamber* lay his Eare to the *Truncke*: And this may be the aptest Meanes, to make a Judgement, whether *Sounds* descend, or ascend, better.

Experiments in Consort, touching the *Lasting* and *Perishing* of *Sounds*; And touching the *Time* they require to their *Generation*, or *Delation*.

AFter that *Sound* is created, (which is in a moment,) wee finde it continueth some small time, melting by little and little. In this there is a wonderfull Errour amongst Men, who take this to bee a *Continuance* of the First *Sound*; whereas (in truth) it is a *Renovation*, and not a *Continuance*: For the *Body percussed*, hath by reason of the *Percussion*, a *Trepidation* wrought in the *Minute Parts*; and so reneweth the *Percussion* of the *Aire*. This appeareth manifestly, because that the Melting *Sound* of a Bell, or of a String strucken, which is thought to be a *Continuance*, ceaseth as soone as the Bell or String are touched. As in a Virginall, as soone as ever the Jacke falleth, and toucheth the String, the Sound ceaseth; And in a Bell, after you have chimed upon it, if you touch the Bell, the *Sound* ceaseth. And in this you must distinguish that there are two *Trepidations*: The one Manifest, and Locall; As of the Bell, when it is Pensile: The other Secret, of the Minute Parts; such as is described in the ninth Instance. But it is true, that the *Locall* helpeth the *Secret* greatly. We see likewise that in Pipes, and other winde Instruments, the *Sound* lasteth no longer, than the breath bloweth. It is true, that in Organs, there is a confused Murmur for a while; after you have plaied; But that is but while the Bellowes are in Falling.

207

208 It is certaine, that in the *Noise* of great *Ordnance*, where many are shot off together, the *Sound* will bee carried, (at the least) twenty Miles upon the land, and much further upon the Water. But then it will come to the Eare; Not in the Instant of the Shooting off, but it will come an Houre, or more later. This must needs be a *Continuance* of the *First Sound*; For there is no *Trepidation* which should renew it. And the Touching of the *Ordnance* would not extinguish the *Sound* the sooner: So that in great *Sounds* the *Continuance* is more then Momentany.

209 To try exactly the time wherein *Sound* is *Delated*, Let a Man stand in a Steeple, and have with him a Taper; And let some vaile be put before the Taper; And let another Man stand in the Field a Mile off. Then let him in the Steeple strike the Bell; And in the same instant withdraw the Vaile; And so let him in the Field tell by his Pulse what distance of *Time* there is betweene the *Light seene*, and the *Sound heard*: For it is certaine that the *Delation* of Light is in an Instant. This may be tried in farre greater Distances, allowing greater *Lights* and *Sounds*.

210 It is generally knowne and observed, that *Light*, and the *Object* of *Sight*, move swifter than *Sound*; For we see the *Flash* of a Peece is seene sooner, than

than the *Noise* is heard. And in Hewing Wood, if one be some distance off, he shall see the Arme lifted up for a second Stroke, before he heare the *Noise* of the first. And the greater the Distance, the greater is the Preventi-
on: As we see in Thunder, which is farre off; where the Lightning prece-
deth the Crack a good space.

Colours, when they represent themselves to the Eye, fade not, nor melt not 211
by Degrees, but appeare still in the same Strength; But *Sounds* melt, and vanish, by little and little. The Cause is, for that *Colours* participate nothing with the *Motion* of the *Aire*; but *Sounds* doe. And it is a plaine Argument, that *Sound* participateth of some *Locall Motion*, of the *Aire*, (as a Cause *Sine quâ non*,) in that, it perisheth so suddenly; For in every Section, or Impulsion of the *Aire*, the *Aire* doth suddenly restore and reunite it self; which the *Water* also doth, but nothing so swiftly.

In the Trials of the *Passage*, or *Not Passage* of *Sounds*, you must take heed, you mistake not the *Passing By the sides* of a Body, for the *Passing thorow* a Body: and therefore you must make the *Intercepting* Body very close; For *Sound* will passe thorow a small Chinck. Experiments in Consort touching the *Passage* and *Interceptions* of *Sounds*.

Where *Sound* passeth thorow a *Hard*, or *Close Body* (as thorow *Water*; 212
thorow a *Wall*; thorow *Metall*, as in Hawkes Bels stopped, &c.) the *Hard*, or *Close Body*, must be but thinne and small; For else it deadeth and extinguisheth the *Sound* utterly. And therefore, in the *Experiment* of *Speaking in Aire under Water*, the voice must not be very deepe within the *Water*: For then the *Sound* pierceth not. So if you speak on the further side of a *Close Wall*, if the *Wall* be very thick, you shall not be heard: And if there were an Hogshead empty, whereof the Sides were some two Foot thick, and the Bunghole stopped; I conceive the Resounding Sound, by the *Communication* of the *Outward Aire*, with the *Aire within*, would be little or none: But only you shall heare the *Noise* of the Outward Knock, as if the Vessell were full.

It is certaine, that in the *Passage* of *Sounds* thorow *Hard Bodies*, the Spi- 213
rit or Pneumaticall Part of the Hard body it selfe, doth cooperate; But much better, when the Sides of that *Hard Body* are struck, than when the Percussion is only within, without Touch of the Sides. Take therefore a Hawkes Bell, the holes stopped up, and hang it by a threed, within a Bottle Glasse; And stop the Mouth of the Glasse, very close with Wax; and then shake the Glasse, and see whether the Bell give any *Sound* at all, or how weak? But note, that you must in stead of the Threed, take a Wire; or else let the Glasse have a great Belly; lest when you shake the Bell, it dash upon the Sides of the Glasse.

It is plaine, that a very *Long*, and *Downe-right Arch*, for the *Sound* to passe, 214
will extinguish the *Sound* quite; So that that *Sound*, which would be heard over a Wall, will not be heard over a Church; Nor that *Sound*, which will be heard, if you stand some distance from the Wall, will be heard if you stand close under the Wall.

Soft and *Foraminous Bodies*, in the *first Creation* of the *Sound*, will dead it; 215
For the striking against Cloth, or Furre, will make little *Sound*; As hath beene said: But in the *Passage* of the *Sound*, they will admit it better than *Harder Bodies*; As we see, that Curtaines, and Hangings, will not stay the *Sound* much; But Glasse-windowes, if they be very Close, will check a

Sound more, than the like Thicknesse of Cloth. We see also, in the Rumbling of the Belly, how easily the *Sound* passeth thorow the Guts, and Skin.

216 It is worthy the Enquiry, whether *Great Sounds*, (As of Ordnance, or Bels) become not more *Weak* and *Exile*, when they passe thorow *Small Crannies*. For the *Subtilities* of *Articulate Sounds*, (it may be) may passe thorow *Small Crannies*, not confused; But the *Magnitude* of the *Sound* (perhaps,) not so well.

Experiments in Consort, touching the *Medium* of *Sounds*.

THe *Mediums* of *Sounds* are *Aire*; *Soft* and *Porous Bodies*; Also *Water*. And *Hard Bodies* refuse not altogether to be *Mediums* of *Sounds*. But all of them are dull and unapt *Deferents*, except the *Aire*.

217 In *Aire*, the Thinner or Drier *Aire*, carrieth not the *Sound* so well, as the more Dense; As appeareth in *Night Sounds*; And *Evening Sounds*; And
218 *Sounds* in moist Weather, and Southerne Winds. The reason is already mentioned in the *Title* of *Mejoration* of *Sounds*; Being for that *Thin Aire* is better pierced; but *Thick Aire* preserveth the *Sound* better from Waste; Let further Triall be made by Hollowing in Mists, and Gentle Showers: For (it may be) that will somewhat dead the *Sound*.

219 How farre forth *Flame* may be a *Medium* of *Sounds*, (especially of such *Sounds* as are created by *Aire*, and not betwixt *Hard Bodies*) let it be tried, in *Speaking* where a *Bonfire* is betweene; But then you must allow for some disturbance, the *Noise* that the *Flame* it selfe maketh.

220 Whether any other *Liquours*, being made *Mediums*, cause a diversity of *Sound* from *Water*, it may be tried: As by the Knapping of the Tongs; Or Striking the Bottome of a Vessell, filled either with Milk, or with Oile; which though they be more light, yet are they more unequall Bodies than Aire.

Of the Natures *of the* Mediums, *we have now spoken*; *As for the* Disposition *of the said* Mediums, *it doth consist in the Penning, or not Penning of the* Aire; *Of which we have spoken before, in the* Title *of* Delation *of* Sounds: *It consisteth also in the* Figure *of the* Concave, *through which it passeth*; *Of which we will speak next*.

Experiments in Consort what the Figures of the Pipes, or Concaves, or the Bodies, Deferent conduce to the Sounds.

How the *Figures* of *Pipes*, or *Concaves*, through which *Sounds* passe; Or of other *Bodies deferent*; conduce to the Variety and Alteration of the *Sounds*; Either in respect of the *Greater Quantity*, or *lesse Quantity* of *Aire*, which the *Concaves* receive; Or in respect of the *Carrying* of *Sounds* longer or shorter way; Or in respect of many other *Circumstances*; they have beene touched, as falling into other *Titles*. But those *Figures*, which we now are to speak of, we intend to be, as they concerne the *Lines*, through which *Sound* passeth; As *Straight*; *Crooked*; *Angular*; *Circular*; *&c.*

221 The *Figure* of a *Bell* partaketh of the *Pyramis*, but yet comming off, and dilating more suddenly. The *Figure* of a *Hunters Horne*, and *Cornet*, is oblique; yet they have likewise *Straight Hornes*; which if they be of the same Bore with the *Oblique*, differ little in *Sound*; save that the Straight require somewhat a stronger Blast. The *Figures* of *Recorders*, and *Flutes*, and *Pipes* are straight; But the *Recorder* hath a lesse Bore, and a greater; Above, and below. The *Trumpet* hath the *Figure* of the *Letter S*: which maketh that

Purling

Purling *Sound*, &c. Generally, the *Straight Line* hath the cleaneſt and roundeſt *Sound*, And the *Crooked* the more Hoarſe, and Jarring.

Of a *Sinuous pipe*, that may have ſome foure Flexions, Triall would be made. Likewiſe of a *Pipe*, made like a *Croſſe*, open in the middeſt. And ſo likewiſe of an *Angular Pipe:* And ſee what will be the Effects of theſe ſeverall *Sounds*. And ſo againe of a *Circular Pipe*; As if you take a *Pipe* perfect Round, and make a Hole whereinto you ſhall blow; And another Hole not farre from that; But with a Traverſe or Stop between them; So that your Breath may goe the Round of the *Circle*, and come forth at the ſecond Hole. You may trie likewiſe *Percuſſions* of *Solid Bodies* of ſeverall *Figures*; As *Globes*, *Flats*, *Cubes*, *Croſſes*, *Triangles*, &c. And their *Combinations*; As *Flat* againſt *Flat*; And *Convex* againſt *Convex*; And *Convex* againſt *Flat*, &c. And mark well the diverſities of the *Sounds*. Trie alſo the difference in *Sound* of ſeverall *Craſſitudes* of *Hard Bodies* percuſſed; And take knowledge of the diverſities of the *Sounds*. I my ſelfe have tried, that a *Bell* of *Gold* yeeldeth an excellent *Sound*, not inferiour to that of *Silver*, or *Braſſe*, but rather better: yet we ſee that a piece of Money of *Gold* ſoundeth farre more flat than a peece of Money of *Silver*. 222

The *Harpe* hath the *Concave*, not along the *Strings*, but acroſſe the *Strings*; And no *Inſtrument* hath the *Sound* ſo Melting, and Prolonged, as the *Iriſh Harpe*. So as I ſuppoſe, that if a *Virginall* were made with a double *Concave*; the one all the length as the *Virginall* hath; the other at the End of the *Strings*, as the *Harpe* hath; It muſt needs make the *Sound* perfecter, and not ſo Shallow, and Jarring. You may trie it, without any Sound-Board along, but onely Harp-wiſe, at one End of the *Strings:* Or laſtly with a double *Concave*, at Each end of the *Strings* one. 223

Experiments in Conſort, touching the *Mixture* of *Sounds*.

THere is an apparent Diverſitie between the *Species Viſible*, and *Audible*, in this; That the *Viſible* doth not *mingle* in the *Medium*, but the *Audible* doth. For if we looke abroad, we ſee Heaven, a number of Starres, Trees, Hills, Men, Beaſts, at once. And the *Species* of the one doth not confound the other. But if ſo many *Sounds* come from ſeverall Parts, one of them would utterly confound the other. So we ſee, that *Voyces* or *Conſorts* of *Muſick* doe make an Harmony by *Mixture*, which *Colours* doe not. It is true neverthelesſe, that a great *Light* drowneth a ſmaller, that it cannot be ſeene; As the *Sunne* that of a *Gloworme*; as well as a Great *Sound* drowneth a leſſer. And I ſuppoſe likewiſe, that if there were two Lanthornes of Glaſſe, the one a Crimſin, and the other an Azure, and a Candle within either of them, thoſe Coloured Lights would mingle and caſt upon a White Paper a Purple Colour. And even in *Colours*, they yeeld a faint and weak *Mixture:* For white walls make Roomes more lightſome than black, &c. But the Cauſe of the *Confuſion* in *Sounds*, and the *Inconfuſion* in *Species Viſible*, is, For that the *Sight* worketh in Right Lines, and maketh ſeverall *Cones*; And ſo there can be no Coincidence in the Eye, or Viſuall Point: But *Sounds*, that move in Obliqe and Arcuate Lines, muſt needs encounter, and diſturbe the one the other. 224

The ſweeteſt and beſt *Harmony* is, when every *Part*, or *Inſtrument*, is not heard by it ſelfe, but a Conflation of them all; Which requireth to ſtand ſome diſtance off. Even as it is in the *Mixture* of Perfumes; Or the Taking of the Smels of ſeverall *Flowers* in the *Aire*. 225

The *Diſpoſition* of the *Aire*, in other *Qualities*, except it be joyned with *Sound*, hath no great Operation upon *Sounds:* For whether the *Aire* bee 226

lightſome or darke, hot or cold, quiet or ſtirring, (except it be with *Noiſe*) ſweet-ſmelling, or ſtinking, or the like; it importeth not much: Some petty Alteration or difference it may make.

227 But *Sounds* doe diſturbe and alter the one the other: Sometimes the one drowning the other, and making it not heard; Sometimes the one jarring and diſcording with the other, and making a Confuſion; Sometimes the one Mingling and Compounding with the other, and making an Harmony.

228 Two *Voices* of like *lowdneſſe*, will not be heard, twice as farre, as one of them alone; And two *Candles* of like light, will not make Things ſeeme twice as farre off, as one. The Cauſe is profound; But it ſeemeth that the *Impreſſions* from the *Objects* of the *Senſes*, doe *mingle* reſpectively, every one with his kinde; But not in proportion, as is before demonſtrated: And the reaſon may be, becauſe the firſt *Impreſſion*, which is from *Privative* to *Active*, (As from *Silence* to *Noiſe*, or from *Darkneſſe* to *Light*,) is a greater Degree, than from *Leſſe Noiſe*, to *More Noiſe*, or from *Leſſe Light* to *More Light*. And the Reaſon of that againe may be; For that the *Aire*, after it hath received a Charge, doth not receive a Surcharge, or greater Charge, with like Appetite, as it doth the firſt Charge. As for the Encreaſe of Vertue, generally, what Proportion it beareth to the Encreaſe of the Matter, it is a large Field, and to be handled by it ſelfe.

Experiments in Conſort touching *Melioration* of *Sounds*.

229 ALL *Reflexions Concurrent* doe make *Sounds* Greater; But if the Body that createth, either, the Originall *Sound*, or the *Reflexion*, be clean and ſmooth, it maketh them Sweeter. Triall may be made of a *Lute*, or *Violl*, with the Belly of poliſhed Braſſe, in ſtead of Wood. We ſee that even in the Open Aire, the *Wire String* is ſweeter, than the *String* of *Guts*. And we ſee that for *Reflexion*, *Water* excelleth; As in *Muſick* near the *Water*; Or in *Eccho's*.

230 It hath been tryed, that a *Pipe* a little moiſtned on the inſide, but yet ſo as there be no Drops left, maketh a more ſolemne *Sound*, than if the *Pipe* were dry: But yet with a ſweet Degree of *Sibillation*, or *Purling*; As we touched it before in the title of *Equality*. The Cauſe is, for that all Things Porous, being ſuperficially wet, and (as it were) between drie and wet, become a little more Even and Smooth; But the Purling, (which muſt needs proceed of Inequalitie,) I take to be bred between the Smoothneſſe of the inward Surface of the *Pipe*, which is wet; And the Reſt of the Wood of the *Pipe*, unto which the Wet commeth not, but it remaineth drie.

231 In *Froſty Weather*, *Muſick* within doors ſoundeth better. Which may be, by reaſon, not of the Diſpoſition of the *Aire*, but of the *Wood* or *String* of the *Inſtrument*, which is made more Criſpe, and ſo more porous and hollow: And we ſee that *Old Lutes* ſound better than *New*, for the ſame reaſon. And ſo doe *Lute-ſtrings* that have been kept long.

232 *Sound* is likewiſe *Meliorated* by the *Mingling* of *Open Aire* with *Pent Aire*; Therefore Triall may be made, of a *Lute* or *Violl* with a double Belly; Making another Belly with a Knot over the Strings; yet ſo, as there bee Room enough for the Strings, and Room enough to play below that Belly. Triall may be made alſo of an *Iriſh Harpe*, with a Concave on both Sides; whereas it uſeth to have it but on one Side. The doubt may be, leſt it ſhould make too much Reſounding; whereby one Note would overtake another.

233 If you ſing in the Hole of a *Drum*, it maketh the *Singing* more ſweet. And ſo I conceive it would, if it were a *Song* in Parts, ſung into ſeverall *Drums*; And for handſomneſſe and ſtrangeneſſe ſake, it would not be amiſſe to have a Curtain between the Place, where the *Drums* are, and the *Hearers*.

When

When a *Sound* is created in a *Wind-Instrument*, between the *Breath* and the *Aire*, yet if the *Sound* be communicate with a more equall Body of the *Pipe*, it *meliorateth* the *Sound*. For (no doubt) there would be a differing *Sound* in a Trumpet, or *Pipe* of *Wood*; And again in a *Trumpet* or *Pipe* of *Brasse*. It were good to trie *Recorders* & *Hunters Hornes* of *Brasse*, what the *Sound* would be. 234

Sounds are *meliorated* by the *Intension* of the *Sense*, where the *Common Sense* is collected most, to the *particular Sense* of *Hearing*, and the *Sight* suspended: And therefore, *Sounds* are sweeter, (as well as greater,) in the *Night*, than in the *Day*; And I suppose, they are sweeter to blinde Men, than to Others: And it is manifest, that betweene *Sleeping* and *Waking*, (when all the *Senses* are bound and suspended) *Musick* is farre sweeter, than when one is *fully Waking*. 235

Experiments in Consort, touching the *Imitation* of *Sounds*.

IT is a Thing strange in Nature, when it is attentively considered; How *Children*, and some *Birds*, learne to *imitate Speech*. They take no Marke (at all) of the *Motion* of the *Mouth* of Him that speaketh; For *Birds* are as well taught in the Darke, as by Light. The *Sounds* of *Speech* are very Curious and Exquisite: So one would thinke it were a Lesson hard to learne. It is true, that it is done with time, and by little and little, and with many Essayes and Proffers: But all this dischargeth not the Wonder. It would make a Man think (though this which we shall say may seeme exceeding strange) that there is some *Transmission* of Spirits; and that the *Spirits* of the *Teacher* put in Motion, should worke with the *Spirits* of the *Learner*, a Pre-disposition to offer to *Imitate*; And so to perfect the *Imitation* by degrees. But touching *Operations* by *Transmissions* of *Spirits*, (which is one of the highest secrets in Nature,) we shall speake in due place; Chiefly when we come to enquire of *Imagination*. But as for *Imitation*, it is certaine, that there is in Men, and other Creatures, a pre-disposition to *Imitate*. We see how ready Apes and Monkies are, to *imitate* all Motions of Man: And in the Catching of Dottrells, we see, how the Foolish Bird playeth the Ape in Gestures: And no Man (in effect) doth accompany with others, but he learneth, (ere he is aware,) some Gesture, or Voice, or Fashion of the other. 236

In *Imitation* of *Sounds*, that *Man* should be the *Teacher*, is no Part of the Matter; For *Birds* will learne one of another; And there is no Reward, by feeding, or the like, given them for the *Imitation*; And besides, you shall have Parrots, that will not onely *imitate* Voices, but Laughing, Knocking, Squeaking of a Doore upon the Hinges, or of a Cart-wheele; And (in effect) any other *Noise* they heare. 237

No *Beast* can *imitate* the *Speech* of *Man*, but *Birds* onely; For the Ape it selfe, that is so ready to *imitate* otherwise, attaineth not any degree of *Imitation* of Speech. It is true, that I have known a Dog, that if one howled in his Eare, he would fall a howling a great while. What should be the Aptnesse of *Birds*, in comparison of *Beasts*, to *imitate* the *Speech* of *Man*, may be further enquired. Wee see that *Beasts* have those Parts, which they count the *Instruments* of *Speech*, (as *Lips*, *Teeth*, &c.) liker unto *Man*, than *Birds*. As for the *Necke*, by which the *Throat* passeth; we see many *Beasts* have it, for the Length, as much as *Birds*. What better *Gorge*, or Attire, *Birds* have, may be further enquired. The *Birds* that are knowne to be Speakers, are, *Parrats*, *Pyes*, *Iayes*, *Dawes*, and *Ravens*. Of which *Parrats* have an adunque Bill, but the rest not. 238

But I conceive, that the *Aptnesse* of *Birds*, is not so much in the *Conformity* of the *Organs* of *Speech*, as in their *Attention*. For *Speech* must come by *Hearing*, 239

Hearing, and *Learning*; And *Birds* give more heed, and marke *Sounds*, more than *Beasts*; Because naturally they are more delighted with them, and practise them more; As appeareth in their *Singing*. We see also, that those that teach *Birds* to sing, doe keep them Waking, to increase their *Attention*. We see also, that *Cock-Birds*, amongst *Singing-Birds*, are ever the better *Singers*; which may be, because they are more lively, and listen more.

240 *Labour*, and *Intention* to *imitate Voyces*, doth conduce much to *Imitation*: And therefore we see, that there be certaine *Pantomimi*, that will represent the voyces of *Players* of *Enterludes*, so to life, as if you see them not, you would think they were those *Players* themselves; And so the *Voyces* of other *Men* that they heare.

241 There have beene some, that could counterfeit the *Distance* of *Voices*, (which is a *Secondary Object* of *Hearing*,) in such sort; As when they stand fast by you, you would think the *Speech* came from a farre off, in a fearfull manner. How this is done, may be further enquired. But I see no great use of it, but for Imposture, in counterfeiting Ghosts or Spirits.

Experiments in Consort, touching the *Reflexion* of *Sounds*.

There be three Kindes of *Reflexions* of *Sounds*; A *Reflexion Concurrent*; A *Reflexion Iterant*, which we call *Eccho*; And a *Super-reflexion*, or an *Eccho* of an *Eccho*, whereof the first hath beene handled in the *Title* of *Magnitude* of *Sounds*: The Latter two we will now speak of.

242 The *Reflexion* of *Species Visible*, by *Mirrours*, you may command; Because passing in Right Lines, they may be guided to any point: But the *Reflexion* of *Sounds* is hard to master; Because the *Sound* filling great Spaces in Arched Lines, cannot be so guided: And therefore we see there hath not beene practised, any Meanes to make *Artificiall Eccho's*. And no *Eccho* already knowne returneth in a very narrow Roome.

243 The *Naturall Eccho's* are made upon *Walls*, *Woods*, *Rocks*, *Hills*, and *Banckes*; As for *Waters*, being neare, they make a *Concurrent Eccho*; but being further off, (as upon a large *River*) they make an *Iterant Eccho*: For there is no difference between the *Concurrent Eccho*, and the *Iterant*, but the Quicknesse, or Slownesse of the Returne. But there is no doubt, but *Water* doth helpe the *Delation* of *Eccho*; as well as it helpeth the *Delation* of *Originall Sounds*.

244 It is certaine, (as hath beene formerly touched,) that if you speake thorow a *Trunke*, stopped at the further end, you shall finde a Blast returne upon your Mouth, but no *Sound* at all. The *Cause* is, for that the *Closenesse*, which preserveth the *Originall*, is not able to preserve the *Reflected Sound*: Besides that *Eccho's* are seldome created, but by loud *Sounds*. And therefore there is lesse hope of *Artificiall Eccho's* in Aire, pent in a narrow Concave. Nevertheless it hath bin tried, that One leaning over a *Well*, of 25. Fathome deep, and speaking, though but softly, (yet not so soft as a whisper,) the *Water* returned a good *Audible Eccho*. It would be tried, whether Speaking in *Caves*, where there is no Issue, save where you speak, will not yeeld *Eccho's*, as *Wells* doe.

245 The *Eccho* commeth as the *Originall Sound doth*, in a round Orbe of Aire: It were good to try the Creating of the *Eccho*, where the Body Repercussing maketh an Angle: As against the Returne of a Wall, &c. Also we see that in *Mirrours*, there is the like Angle of Incidence, from the Object to the Glasse, and from the Glasse to the Eye. And if you strike a *Ball* side-long, not full upon the Surface, the Rebound will be as much the contrary way; Whether

ther there be any ſuch *Reſilience* in *Eccho's*, (that is, whether a Man ſhall heare better, if he ſtand aſide the Body Repercuſſing, than if he ſtand where he ſpeaketh, or any where in a right Line betweene;) may be tried. Triall likewiſe would be made, by Standing nearer the place of Repercuſſing, than he that ſpeaketh; And againe by Standing further off, than he that ſpeaketh; And ſo knowledge would be taken, whether *Eccho's*, as well as *Originall Sounds*, be not ſtrongeſt neare hand.

There be many Places, where you ſhall heare a number of *Eccho's* one after another: And it is, when there is Variety of *Hills* or *Woods*, ſome nearer, ſome further off: So that the Returne from the further, being laſt created, will be likewiſe laſt heard. 246

As the *Voice* goeth round, as well towards the Back, as towards the Front of him that ſpeaketh; So likewiſe doth the *Eccho*; For you have many Back-*Eccho's* to the Place where you ſtand. 247

To make an *Eccho*, that will report, three, or foure, or five Words, diſtinctly, it is requiſite, that the *Body Repercuſſing*, be a good diſtance off: For if it be neare, and yet not ſo neare, as to make a *Concurrent Eccho*, it choppeth with you upon the ſudden. It is requiſite likewiſe, that the *Aire* bee not much *pent*. For *Aire*, at a great diſtance, *pent*, worketh the ſame effect with *Aire*, at *large*, in a ſmall diſtance. And therefore in the *Triall* of *Speaking* in the *Well*, though the *Well* was deepe, the *Voice* came back, ſuddenly; And would beare the Report but of two Words. 248

For *Eccho's* upon *Eccho's*, there is a rare Inſtance thereof in a Place, which I will now exactly deſcribe. It is ſome three or foure Miles from *Paris*, neare a Towne called *Pont-Charenton*; And ſome Bird-bolt ſhot, or more, from the River of *Seane*. The Roome is a *Chappell*, or ſmall *Church*. The Walls all ſtanding, both at the Sides, and at the Ends. Two Rowes of Pillars, after the manner of Iſles of *Churches*, alſo ſtanding; The Roofe all open, not ſo much as any Embowment neere any of the walls left. There was againſt every Pillar, a Stack of Billets, above a Mans Height; which the Watermen, that bring Wood downe the *Seane*, in Stacks, and not in Boats, laid there (as it ſeemeth) for their eaſe. Speaking at the one End, I did heare it returne the Voice thirteene ſeverall times; And I have heard of others, that it would returne ſixteene times: For I was there about three of the Clock in the afternoone: And it is beſt, (as all other *Eccho's* are) in the Evening. It is manifeſt, that it is not *Eccho's* from ſeverall places, but a *Toſſing* of the *Voyce*, as a Ball, to and fro; Like to *Reflexions* in *Looking-glaſſes*; where if you place one *Glaſſe* before, and another behinde, you ſhall ſee the *Glaſſe* behinde with the *Image*, within the *Glaſſe* before; And againe, the *Glaſſe* before in that; and divers ſuch *Super-Reflexions*, till the *ſpecies ſpeciei* at laſt die. For it is every Returne weaker, and more ſhady. In like manner, the *Voice* in that *Chappell*, createth *ſpeciem ſpeciei*, and maketh ſucceeding *Super-Reflexions*; For it melteth by degrees, and every *Reflexion* is weaker than the former: So that, if you ſpeake three Words, it will (perhaps) ſome three times report you the whole three Words; And then the two latter Words for ſome times; And then the laſt Word alone for ſometimes; Still fading, and growing weaker. And whereas in *Eccho's* of one Returne, it is much to heare foure or five Words; In this *Eccho* of ſo many Returnes, upon the matter, you heare above twenty Words for three. 249

The like *Eccho* upon *Eccho*, but only with two Reports, hath beene obſerved to be, if you ſtand betweene a *Houſe*, and a *Hill*, and lure towards the 250

Hill

Hill. For the *House* will give a *Back-Eccho*; One taking it from the other, and the latter the weaker.

251 There are certaine *Letters*, that an *Eccho* will hardly expresse; As *S*, for one; Especially being Principall in a Word. I remember well, that when I went to the *Eccho* at *Pont-Charenton*, there was an Old *Parisian*, that took it to be the Work of Spirits, and of good Spirits. For, (said he) call *Satan*, and the *Eccho* will not deliver backe the Devils name; But will say, *Va'en*; Which is as much in *French*, as *Apage*, or *Avoid*. And thereby I did hap to finde, that an *Eccho* would not returne *S*, being but a Hissing and an *Interiour Sound*.

252 *Eccho's* are some more sudden, and chop againe, as soone as the *Voice* is delivered; As hath beene partly said: Others are more deliberate, that is, give more Space betweene the *Voice*, and the *Eccho*; which is caused by the locall Nearnesse, or Distance: Some will report a longer Traine of Words; And some a shorter: Some more loud (full as loud as the *Originall*, and sometimes more loud;) And some weaker and fainter.

253 Where *Eccho's* come from severall Parts, at the same distance, they must needs make (as it were) a Quire of *Eccho's*, and so make the Report greater, and even a *Continued Eccho*; which you shall find in some *Hills*, that stand encompassed, Theatre-like.

254 It doth not yet appeare, that there is *Refraction* in *Sounds*, as well as in *Species Visible*. For I doe not thinke, that if a *Sound* should passe through divers *Mediums*, (as *Aire*, *Cloth*, *Wood*) it would deliver the *Sound*, in a differing Place, from that unto which it is deferred; which is the Proper Effect of *Refraction*. But *Majoration* which is also the Worke of *Refraction*, appeareth plainly in *Sounds*, (as hath beene handled at full;) But it is not by Diversitie of *Mediums*.

Experiments in Consort, touching the *Consent* and *Dissent* between *Visibles* and *Audibles*.

Wee haue *obiter*, for Demonstrations sake, used in divers *Instances*, the *Examples* of the *Sight*, and *Things Visible*, to illustrate the *Nature* of *Sounds*. But we thinke good now to prosecute that *Comparison* more fully.

CONSENT OF VISIBLES and Audibles.

255 *Both* of them *spread themselves in Round*, and fill a whole Floare or Orbe, unto certaine Limits: And are carried a great way: And do languish and lessen by degrees, according to the Distance of the objects from the Sensories.

256 *Both* of them have the whole *Species in every small portion of the Aire* or *Medium*, So as the *Species* doe passe through small Cranies, without Confusion: As we see ordinarily in *Levels*, as to the *Eye*; And in *Crannies*, or *Chinks*, as to the *Sound*.

257 *Both* of them are of a *sudden and easie Generation* and *Delation*; And likewise *perish swiftly*, and *suddenly*; As if you remove the *Light*; Or touch the *Bodies* that give the *Sound*.

Both

Both of them doe *receive* and *carry exquisite* and *accurate Differences*; As of Colours, Figures, Motions, Distances, in *Visibles*; And of Articulate Voices, Tones, Songs, and Quaverings, in *Audibles*. 258

Both of them in their Vertue and Working, do not appeare to *emit any Corporall Substance* into their *Mediums*, or the Orbe of their Vertue; Neither again to rise or stirre any *evident locall Motion* in their *Mediums*, as they passe; But only to carry certaine *Spirituall Species*; The perfect knowledge of the Cause whereof, being hitherto scarcely attained, we shall search and handle in due place. 259

Both of them seeme not to *generate* or *produce* any other *Effect in Nature*, but such as appertaineth to their proper Objects, and Senses, and are otherwise Barren. 260

But *Both* of them in their owne proper Action, doe worke three manifest *Effects*. The First, in that the *Stronger Species drowneth the Lesser*; As the Light of the Sun, the light of a Glow-worme; The Report of an Ordnance, the Voice: The Second, in that an *Object of Surcharge or Excesse destroyeth the Sense*; As the Light of the Sunne the Eye, a violent *Sound* (neare the Eare) the Hearing: The Third, in that *both of them will be reverberate*; As in *Mirrours*; And in *Eccho's*. 261

Neither of them doth *destroy or hinder the Species of the other*, although they *encounter* in the same *Medium*; As Light or Colour hinder not *Sound*; Nor *è contra*. 262

Both of them *affect the Sense in Living Creatures*, and yeeld *Objects of Pleasure and Dislike*: Yet nevertheless, the *Objects* of them doe also (if it be well observed) affect and worke upon dead Things; Namely such, as have some Conformity with the *Organs* of the two *Senses*; As *Visibles* worke upon a *Looking-glasse*, which is like the Pupill of the Eye; And *Audibles* upon the Places of *Eccho*, which resemble, in some sort, the Caverne and structure of the Eare. 263

Both of them do *diversly work, as they have their Medium diversly disposed*. So a Trembling *Medium* (as Smoake) maketh the Object seeme to tremble; and a Rising or Falling *Medium* (as Winds) maketh the *Sounds* to rise, or fall. 264

To *Both*, the *Medium*, which is the most Propitious and Conducible, is *Aire*; For Glasse or Water, &c. are not comparable. 265

In *Both* of them, where the *object is Fine and Accurate*, it conduceth much to haue the *Sense Intentive, and Erect*; In so much as you contract your *Eye*, when you would see sharply; And erect your *Eare*, when you would heare attentively; which in Beasts that haue Eares moveable, is most manifest. 266

The *Beames* of *Light*, when they are *multiplied*, and *conglomerate*, generate *Heat*; which is a different Action, from the Action of *Sight*: And the *Multiplication* and *Conglomeration* of *Sounds* doth generate an extreme *Rarefaction* of the *Aire*; which is an Action materiate, differing from the Action of *Sound*; If it bee true (which is anciently reported) that *Birds*, with great shouts, have fallen downe. 267

DIS-

DISSENTS OF VISIBLES and Audibles.

268 THe *Species* of *Visibles* seeme to be *Emissions* of *Beames* from the *Object seen*; Almost like Odours, save that they are more Incorporeall: But the *Species* of *Audibles* seeme to Participate more with *Locall Motion*, like *percussions*, or *Impressions* made upon the *Aire*. So that whereas all Bodies doe seeme to worke in two manners; Either by the *Communication* of their *Natures*; Or by the *Impressions* and *Signatures* of their *Motions*; The *Diffusion* of *Species Visible* seemeth to participate more of the former *Operation*; and the *Species Audible* of the latter.

269 The *Species* of *Audibles* seeme to be carried more manifestly thorow the *Aire*, than the *Species* of *Visibles*: For (I conceive) that a Contrary strong Wind will not much hinder the Sight of *Visibles*, as it will doe the Hearing of *Sounds*.

270 There is one *Difference*, above all others, betweene *Visibles* and *Audibles*, that is the most remarkable; as that whereupon many smaller Differences doe depend: Namely, that *Visibles*, (except *Lights*,) are *carried in Right Lines*; and *Audibles* in *Arcuate Lines*. Hence it commeth to passe, that *Visibles* doe not intermingle, and confound one another, as hath beene said before; But *Sounds* doe. Hence it commeth, that the Solidity of Bodies doth not much hinder the Sight, so that the Bodies be cleare, and the Pores in a Right Line, as in Glasse, Chrystall, Diamonds, Water, &c. But a thin Scarfe, or Handkerchiefe, though they be Bodies nothing so solid, hinder the Sight: Whereas (contrariwise) these Porous Bodies doe not much hinder the Hearing, but solid Bodies doe almost stop it, or at the least attenuate it. Hence also it commeth, that to the *Reflexion* of *Visibles*, small Glasses suffice; but to the *Reverberation* of *Audibles*, are required greater Spaces, as hath likewise beene said before.

271 *Visibles* are seene further off, than *Sounds* are heard; Allowing nevertheless the *Rate* of their *Bignesse*: For otherwise a *great Sound* will be heard further off, than a *Small Body* seene.

272 *Visibles* require (generally) some *Distance* betweene the *Object*, and the *Eye*, to bee better seene; Whereas in *Audibles*, the nearer the Approch of the *Sound* is to the Sense, the better. But in this there may be a double Error. The one because to *Seeing*, there is required *Light*; And any thing that toucheth the Pupill of the Eye (all over,) excludeth the *Light*. For I have heard of a Person very credible, (who himselfe was cured of a Cataract in one of his Eyes,) that while the Silver Needle did worke upon the Sight of his Eye, to remove the Filme of the Cataract, he never saw any thing more cleare or perfect, than that white Needle: Which (no doubt,) was, because the Needle was lesser than the *Pupill* of the *Eye*, and so tooke not the Light from it. The other Errour may be, for that the *Object* of *Sight* doth strike upon the *pupill* of the *Eye*, directly without any interception; whereas the *Cave* of the *Eare* doth hold off the *Sound* a little from the Organ: And so nevertheless there is some *Distance* required in both.

273 *Visibles* are swiftlier carried to the *Sense*, than *Audibles*; As appeareth in Thunder

Thunder and Lightning; Flame and Report of a Peece; Motion of the Aire in Hewing of Wood. All which have beene set downe heretofore, but are proper for this *Title*.

I conceive also, that the *Species* of *Audibles*, doe hang longer in the Aire than those of *Visibles*: For although even those of *Visibles*, doe hang some ime, as we see in *Rings turned*, that shew like Spheres; In *Lute-strings* fillipped; A *Fire-brand* carried along, which leaveth a Traine of Light behinde it; and in the *Twilight*; And the like: Yet I conceive that *Sounds* stay longer, because they are carried up and downe with the Winde: And because of the Distance of the Time, in *Ordnance discharged*, and *heard* twenty Miles off. 274

In *Visibles*, there are not found Objects so odious and ingrate to the *Sense*, as in *Audibles*. For foule *Sights* doe rather displease, in that they excite the Memory of foule Things, than in the immediate Objects. And therefore in *Pictures*, those foule Sights doe not much offend; But in *Audibles*, the Grating of a Saw, when it is sharpned, doth offend so much, as it setteth the Teeth on Edge. And any of the *harsh Discords* in *Musicke*, the Eare doth straight-wayes refuse. 275

In *Visibles*, after great Light, if you come suddenly into the *Darke*; Or contrariwise, out of the *Darke* into a *Glaring light*, The Eye is dazled for a time, and the *Sight* confused; But whether any such Effect be after great *Sounds*, or after *a deepe Silence*, may be better enquired. It is an old Tradition, that those that dwell neare the *Catarracts* of *Nilus*, are strucken deafe: But we finde no such effect, in Cannoniers, nor Millers, nor those that dwell upon Bridges. 276

It seemeth that the *Impression* of *Colour* is so weak, as it worketh not but by a Cone of Direct *Beames*, or Right Lines; whereof the Basis is in the Object, and the Verticall Point in the Eye; So as there is a Corradiation and Conjunction of *Beames*; And those *Beames* so sent forth, yet are not of any force to beget the like borrowed or second *Beames*, except it be by *Reflexion*, whereof we speak not. For the *Beames* passe, and give little Tincture to that Aire, which is Adjacent; which if they did, we should see *Colours* out of a Right line. But as this is in *Colours*, so otherwise it is in the *Body* of *Light*. For when there is a Skreene between the Candle and the Eye, yet the *Light* passeth to the Paper whereon One writeth; So that the *Light* is seene, where the Body of the *Flame* is not seene; And where any *Colour* (if it were placed where the Body of the *Flame* is) would not be seene. I judge that *Sound* is of this Latter Nature: For when two are placed on both sides of a Wall, and the Voice is heard, I judge it is not onely the *Originall Sound*, which passeth in an *Arched Line*; But the *Sound*, which passeth above the Wall in a Right Line, begetteth the like Motion round about it, as the first did, though more weake. 277

ALL *Concords* and *Discords* of *Musicke*, are (no doubt) *Sympathies* and *Antipathies* of *Sounds*. And so (likewise) in that *Musicke*, which we call *Broken Musicke*, or *Consort Musicke*; Some *Consorts* of *Instruments* are sweeter than others; (A Thing not sufficiently yet observed:) As the *Irish Harpe*, and *Base Viall* agree well: The *Recorder* and *Stringed Musicke* agree well: *Organs* and the *Voice* agree well; &c. But the *Virginalls* and the *Lute*; Or the *Welch-Harpe*, and *Irish-Harpe*; Or the *Voice* and *Pipes* alone, agree not so well; But for the *Melioration* of *Musick*, there is yet much left (in this Point of *Exquisite Consorts*) to trie and enquire. Experiments in Consort touching the *Sympathy* or *Antipathy* of *Sounds*, one with another. 278

279 There is a Common Obſervation, that if a *Lute*, or *Viall*, be layed upon the Backe, with a ſmall Straw upon one of the *Strings*; And another *Lute* or *Viall* be laid by it; And in the other *Lute*, or *Viall*, the *Vniſon* to that *String* be ſtrucken; it will make the *String* move; Which will appeare both to the Eye, and by the *Strawes* Falling off. The like will be, if the *Diapaſon* or *Eight* to that *String* be ſtrucken, either in the ſame *Lute*, or *Viall*, or in others lying by; But in none of theſe there is any Report of *Sound*, that can be diſcerned, but onely Motion.

280 It was devited, that a *Viall* ſhould haue a Lay of Wire Strings below, as cloſe to the Belly as a *Lute*; And then the *Strings* of Guts mounted upon a Bridge, as in Ordinary *Vialls*; To the end, that by this means, the upper *Strings* ſtrucken, ſhould make the lower reſound by *Sympathy*, and ſo make the *Muſicke* the better; Which, if it be to purpoſe, then *Sympathy* worketh, as well by Report of *Sound*, as by *Motion*. But this device I conceive to be of no uſe, becauſe the upper *Strings*, which are ſtopped in great variety, cannot maintaine a *Diapaſon* or *Vniſon*, with the Lower, which are never ſtopped. But if it ſhould be of uſe at all; it muſt be in *Inſtruments* which haue no Stops; as *Virginalls*, and *Harpes*; wherein triall may be made of two Rowes of Strings, diſtant the one from the other.

281 The *Experiment* of *Sympathy* may be transferred (perhaps) from *Inſtruments* of *Strings*, to other *Inſtruments* of *Sound*. As to try if there were in one Steeple, two *Bells* of *Vniſon*, whether the ſtriking of the one would move the other, more then if it were another Accord: And ſo in *Pipes*, (if they be of equall Bore, and *Sound*,) whether a little Straw or Feather would move in the one *Pipe*, when the other is blowne at an *Vniſon*.

282 It ſeemeth both in *Eare*, and *Eye*, the *Inſtrument* of *Senſe* hath a *Sympathy* or Similitude with that which giveth the *Reflexion*; (As hath beene touched before.) For as the *Sight* of the *Eye* is like a Cryſtall, or Glaſſe, or Water; So is the *Eare* a ſinuous Cave, with a hard Bone, to ſtop and reverberate the *Sound*: Which is like to the Places that report *Eccho's*.

Experiments in Conſort touching the *Hindring* or *Helping* of the *Hearing*.

When a Man *Yawneth*; he cannot *Heare* ſo well. The *Cauſe* is, for that the *Membrane* of the *Eare* is extended; And ſo rather caſteth off the *Sound*, than draweth it to.

283 We *Heare* better when we *hold our Breath*, than contrary; In ſo much as in all Liſtening to attaine a *Sound* a farre off, Men *hold their Breath*. The *Cauſe* is, For that in all *Expiration*, the Motion is Outwards;

284 And therefore, rather driveth away the voice, than draweth it: And beſides we ſee, that in all *Labour* to doe things with any ſtrength, wee *hold the Breath*: And liſtening after any *Sound*, that is heard with difficultie, is a kind of *Labour*.

285 Let it be tryed, for the *Helpe* of the *Hearing*, (and I conceive it likely to ſucceede,) to make an *Inſtrument* like a *Tunnell*; The narrow Part whereof may be of the Bigneſſe of the Hole of the *Eare*; And the Broader End much larger, like a *Bell* at the Skirts; And the length half a foot, or more. And let the narrow End of it be ſet cloſe to the *Eare*: And marke whether any *Sound*, abroad in the open Aire, will not be heard diſtinctly, from further diſtance, than without that Inſtrument; being (as it were) an *Eare-Spectacle*. And I have heard there is in *Spaine*, an *Inſtrument* in uſe to be ſet to the *Eare*, that *helpeth* ſomewhat thoſe that are Thicke of Hearing.

286 If the *Mouth* be ſhut Cloſe, neverthelesſe there is yeelded by the Roof of the mouth, a Murmur. Such as is uſed by dumbe Men: But if the *Noſtrills* be likewiſe ſtopped, no ſuch Murmur can be made; Except it be in the Bottome

tome of the Pallate towards the Throat. Whereby it appeareth manifestly, that a *Sound* in the *Mouth*, except such as aforesaid, if the *Mouth* bestopped, passeth from the *Pallate* through the *Nostrils*.

Experiments in Consort touching the *Spirituall* and *Fine Nature* of *Sounds*.

THe *Repercussion* of *Sounds*, (which we call *Eccho*,) is a great Argument of the *Spirituall Essence* of *Sounds*. For if it were *Corporeall*, the Repercussion should be created in the same manner, and by like *Instruments*, with the *Originall Sound* : But we see what a Number of *Exquisite Instruments* must concurre in Speaking of Words, whereof there is no such Matter in the *Returning* of them ; But onely a plain Stop, and *Repercussion*. 287

The Exquisite *Differences* of *Articulate Sounds*, carried along in the *Aire*, shew that they cannot be *Signatures* or *Impressions* in the *Aire*, as hath beene well refuted by the Ancients. For it is true, that Seales make excellent Impressions : And so it may be thought of *Sounds* in their first Generation: But then the *Delation* and *Continuance* of them without any new Sealing, shew apparently they cannot be Impressions. 288

All *Sounds* are suddenly made, and doe suddenly perish; But neither that, nor the *Exquisite Differences* of them, is Matter of so great Admiration : For the Quaverings, and Warblings in Lutes, and Pipes, are as swift ; And the Tongue, (which is no very fine Instrument,) doth in Speech, make no fewer Motions, than there be Letters in all the Words, which are uttered. But that *Sounds* should not onely be so speedily generated, but carried so farre every way, in such a momentany time, deserveth more Admiration. As for Example ; If a Man stand in the Middle of a Field, and speak aloud, he shall be heard a Furlong in round ; And that shall be in *Articulate Sounds* ; And those shall be Entire in every little Portion of the Aire ; And this shall be done in the Space of lesse than a Minute. 289

The *Sudden Generation* and *Perishing* of *Sounds*, must be one of these two Wayes. Either that the *Aire* suffereth some Force by *Sound*, and then restoreth it selfe ; As Water doth ; Which being divided, maketh many Circles, till it restore it selfe to the naturall Consistence : Or otherwise, that the *Aire* doth willingly imbibe the *Sound* as gratefull, but cannot maintain it ; for that the *Aire* hath (as it should seeme) a secret and hidden Appetite of Receiving the *Sound* at the first ; But then other Grosse and more Materiate Qualities of the Aire straight-wayes suffocate it ; Like unto *Flame*, which is generated with Alacrity, but straight quenched by the Enmity of the *Aire*, or other Ambient Bodies. 290

There be these *Differences* (in generall) by which *Sounds* are divided ; 1. *Musicall, Immusicall*; 2. *Treble, Base*; 3. *Flat, Sharpe*; 4. *Soft, Loud* ; 5. *Exteriour, Interiour* ; 6. *Cleane, Harsh* or *Purling*; 7. *Articulate, Inarticulate*.

We have laboured (as may appear) in this *Inquisition* of *Sounds*, diligently; Both because *Sound* is one of the most Hidden Portions of *Nature*, (as we said in the beginning :) And because it is a *Vertue* which may be called *Incorporeal*, and *Immateriate*; whereof there be in *Nature* but few. Besides, we were willing, (now in these our first *Centuries*,) to make a Patterne or President of an

Exact Inquisition; And wee shall doe the like hereafter in some other Subjects which require it. For we desire that Men should learne and perceive, how severe a Thing the true *Inquisition* of *Nature* is; And should accustome themselves, by the light of Particulars, to inlarge their Mindes, to the Amplitude of the World; and not reduce the World to the Narrownesse of their Mindes.

Experiment Solitary touching the *Orient Colours*, in *Dissolution* of *Metalls*.

291

Metalls give *Orient* and *Fine Colours* in *Dissolutions*; As *Gold* giveth an excellent Yellow; *Quick-Silver* an excellent Greene; *Tinne* giveth an excellent Azure: Likewise in their *Putrefactions*, or *Rusts*; As *Vermilion*, *Verdegrease*, *Bise*, *Cirrus*, &c. And likewise in their *Vitrifications*. The *Cause* is, for that by their Strength of Body, they are able to endure the Fire, or Strong Waters, and to be put into an Equall Posture; And againe to retain Part of their principall Spirit; Which two Things, (Equall Posture, and Quick Spirits) are required chiefly, to make *Colours* lightsome.

Experiment Solitary touching *Prolongation* of *Life*.

292

It conduceth unto *Long Life*, and to the more Placide Motion of the Spirits, which thereby do lesse prey and consume the Juyce of the Body; Either that *Mens Actions be free and voluntary*; that nothing be done *Invitâ Minervâ*, but *Secundum genium*: Or on the other side, that the *Actions* of *Men be full of Regulation, and Commands within themselves*: For then the Victory and Performing of the Command, giveth a good Disposition to the Spirits; Especially if there be a Proceeding from Degree to Degree; For then the Sense of Victory is the greater. An example of the former of these, is in a Countrey life; And of the latter, in *Monkes* and *Philosophers*, and such as do continually enjoyne themselves.

Experiment Solitary touching *Appetite* of *Vnion* in *Bodies*.

293

It is certaine, that in all Bodies, there is an *appetite* of *Vnion*, and Evitation of Solution of Continuity: And of this *Appetite* there be many *Degrees*; But the most Remarkable, and fit to be distinguished, are three. The first in *Liquours*; The second in *Hard Bodies*: And the third in *Bodies Cleaving* or *Tenacious*. In *Liquours*, this *Appetite* is weake: We see in *Liquours*, the *Threding* of them in *Stillicides*, (as hath been said;) The *Falling* of them in *Round Drops*, (which is the forme of *Vnion*;) And the *Staying* of them, for a little time, in *Bubbles and Froth*. In the second *Degree* or *Kinde*, this *Appetite* is strong; As in *Iron*, in *Stone*, in *Wood*, &c. In the third, this *Appetite* is in a *Medium* betweene the other two: For such *Bodies* doe partly follow the Touch of another Body; And partly sticke and continue to themselves; And therefore they roape, and draw themselves in Threds; As wee see in *Pitch*, *Glew*, *Birdlime*, &c. But note, that all *Solide Bodies* are *Cleaving*, more or lesse: and that they love better the Touch of somewhat that is *Tangible*, than of *Aire*. For *Water*, in small quantitie, cleaveth to any Thing that is Solide; And so would *Metall* too, if the weight drew it not off. And therefore *Gold Foliate*, or any *Metall Foliate*, cleaveth: But those *Bodies* which are noted to be Clammy, and Cleaving, are such, as have a more indifferent *Appetite* (at once,) to follow another *Body*; And to hold to themselves. And therefore they are commonly *Bodies* ill mixed; And which take more pleasure in a Forrain Body, than in preserving their own *Consistence*; And which have little predominance in *Drought* or *Moisture*.

TIme, and *Heat*, are Fellows in many Effects. *Heat* drieth Bodies, that do easily expire; As Parchment, Leaves, Roots, Clay, &c. And, so doth *Time* or *Age* arefie; As in the same Bodies, &c. *Heat* dissolveth and melteth Bodies, that keep in their Spirits; As in divers *Liquefactions*; And so doth *Time*, in some Bodies of a softer Consistence: As is manifest in Honey, which by *Age* waxeth more liquid; And the like in Sugar; And so in old Oyle, which is ever more cleare, and more hot in Medicinable use. *Heat* causeth the Spirits to search some Issue out of the Body; As in the *Volatility* of *Metals*; And so doth *Time*; As in the *Rust* of *Mettalls*. But generally *Heat* doth that in small time, which *Age* doth in long.

Experiment Solitary touching the *like Operations* of *Heat*, and *Time* 294

SOme Things which passe the *Fire* are softest at first, and by *Time* grow hard; As the Crumme of Bread. Some are harder when they come from the *Fire*, and afterwards give againe, and grow soft, as the Crust of Bread, Bisket, Sweet Meats, Salt, &c. The *Cause* is, for that in those things which waxe Hard with *Time*, the Work of the *Fire* is a Kinde of *Melting*: And in those that waxe Soft with *Time*, (contrariwise,) the work of the *Fire* is a Kinde of *Baking*; And whatsoever the *Fire* baketh, *Time* doth in some degree dissolve.

Experiment Solitary touching the *differing Operations* of *Fire*, and *Time*. 295

MOtions passe from one Man to another, not so much by Exciting Imagination; as by Invitation; Especially if there be an Aptnesse or Inclination before. Therefore *Gaping*, or *Yawning*, and *Stretching* doe passe from Man to Man; For that that causeth *Gaping* and *Stretching* is, when the Spirits are a little Heavy, by any Vapour, or the like. For then they strive (as it were,) to wring out, and expell that which loadeth them. So Men drowzy, and desirous to sleep; Or before the Fit of an Ague; doe use to Yawne and Stretch; And doe likewise yeeld a *Voyce* or *Sound*, which is an *Interjection* of *Expulsion*: So that if another be apt and prepared to doe the like, he followeth by the Sight of another. So the *Laughing* of another maketh to *Laugh*.

Experiment Solitary, touching *Motions* by *Imitation*. 296

THere be some knowne *Diseases* that are *Infectious*; And Others that are not. Those that are *Infectious*, are; First, such as are chiefly in the *Spirits*, and not so much in the *Humours*; And therefore passe easily from Body to Body: Such are *Pestilences*, *Lippitudes*, and such like. Secondly, such as *Taint* the *Breath*; Which we see passeth manifestly from Man to Man; And not invisible, as the *Affects* of the *Spirits* doe: Such are *Consumptions* of the *Lungs*, &c. Thirdly, such as come forth to the *Skinne*; And therefore taint the *Aire*, or the *Body Adjacent*; Especially if they consist in an Unctuous Substance, not apt to dissipate; Such are *Scabs*, & *Leprosie*. Fourthly, such as are meerly in the *Humours*, and not in the *Spirits*, *Breath*, or *Exhalations*: And therefore they never infect, but by *Touch* onely; And such a *Touch*, also as commeth within the *Epidermis*; As the venome of the *French Poxe*; And the *Biting* of a *Mad Dog*.

Experiment Solitary touching *Infectious Diseases*. 297

MOst *Powders* grow more Close and Coherent by *Mixture* of *Water* than by *Mixture* of *Oyle*, though *Oyle* be the thicker Body; As *Meale*, &c. The Reason is the Congruitie of Bodies; which if it be more, maketh a Perfecter Imbibition, and Incorporation; Which in most *Powders* is more between *Them* and *Water*, then between *Them* and *Oyle*: But *Painters Colours* ground, and *Ashes*, doe better incorporate with *Oyle*.

Experiment Solitary touching the *Incorporation* of *Powders*, and *Liquours*. 298

Experiment Solitary touching *Exercise* of the *Body*.
299

MUch *Motion* and *Exercise* is good for some *Bodies*; And *Sitting*, and *lesse Motion* for others. If the Body be Hot, and Void of Superfluous Moistures, too much *Motion* hurteth: And it is an Errour in *Physitians*, to call too much upon *Exercise*. Likewise men ought to beware, that they use not *Exercise*, and a *Spare Diet* both: But if much *Exercise*, then a *Plentifull Diet*; And if *Sparing Diet*, then little *Exercise*. The *Benefits* that come of *Exercise* are, First, that it sendeth *Nourishment* into the Parts more forcibly. Secondly, that it helpeth to Excerne by *Sweat*, and so maketh the Parts assimilate the more perfectly. Thirdly, that it maketh the *Substance* of the *Body* more *Solide* and *Compact*; And so lesse apt to be Consumed and Depredated by the *Spirits*. The *Evills* that come of *Exercise*, are: First, that it maketh the *Spirits* more Hot and Predatory. Secondly, that it doth absorbe likewise, and attenuate too much the Moisture of the *Body*. Thirdly, that it maketh too great *Concussion*, (especially if it be violent,) of the *Inward Parts*; which delight more in Rest. But generally *Exercise*, if it bee much, is no Friend to *Prolongation* of *Life*; Which is one Cause, why *Women* live longer then *Men*, because they stirre lesse.

Experiment Solitary, touching *Meats* that *induce Saciety*.
300

SOme *Food* wee may use *long*, and *much*, without *Glutting*; As Bread, Flesh that is not fat, or ranck, &c. Some other, (though pleasant,) *Glutteth* sooner; As Sweet Meats, Fat Meats, &c. The *Cause* is, for that *Appetite* consisteth in the Emptinesse of the Mouth of the Stomack; Or possessing it with somewhat that is Astringent; And therefore Cold and Drie. But things that are *Sweet* and *Fat*, are more Filling: And do swimme and hang more about the Mouth of the Stomacke; And go not down so speedily: And again turn sooner to *Choler*, which is hot, and ever abateth the Appetite. We see also, that another *Cause* of *Saciety*, is an *Over-Custome*; and of *Appetite* is *Novelty*: And therefore *Meats*, if the same be continually taken, induce *Loathing*. To give the Reason of the *Distaste* of *Saciety*, and of the *Pleasure* in *Novelty*; and to distinguish not onely in Meats and Drinkes, but also in Motions, Loves, Company, delights, Studies, what they bethat *Custome* maketh more gratefull; And what more tedious; were a large Field. But for *Meats*, the Cause is *Attraction*, which is quicker, and more excited towards that which is new, than towards that whereof there remaineth a Relish by former use. And (generally) it is a Rule, that whatsoever is somewhat Ingrate at first, is made Gratefull by *Custome*; But whatsoever is too Pleasing at first, groweth quickly to *satiate*.

NATU-

NATVRALL HISTORIE.

IV. Century.

ACCELERATION of *Time*, in *Works* of *Nature*, may well be esteemed *Inter Magnalia Naturæ*. And even in *Divine Miracles*, *Accelerating* of the *Time*, is next to the *Creating* of the *Matter*. We will now therefore proceed to the Enquiry of it: And for *Acceleration* of *Germination*, we will referre it over unto the place, where we shall handle the Subject of *Plants*, generally; And will now begin with other *Accelerations*.

Experiments in Consort, touching the *Clarification* of *Liquours*, and the *Accelerating* thereof;

Liquours are (many of them,) at the first, thicke and troubled; As *Must*, *Wort*, *Iuyces* of *Fruits*, or *Hearbs* expressed, &c. And by *Time* they settle, and Clarifie. But to make them cleare, before the *Time*, is a great Work; For it is a Spurre to Nature, and putteth her out of her pace: And besides, it is of good use, for making *Drinkes*, and *Sauces*, Potable, and Serviceable, speedily; But to know the *Meanes* of *Accelerating Clarification*, we must first know the *Causes* of *Clarification*. The first *Cause* is, by the *Separation* of the *Grosser Parts* of the *Liquour*, from the *Finer*. The second, by the *Equall Distribution* of the *Spirits* of the *Liquour*, with the *Tangible Parts*: For that ever representeth Bodies Cleare and Untroubled. The third, by the *Refining* the *Spirit it Selfe*, which thereby giveth to the *Liquour* more Splendour, and more Lustre. 301

First, for *Separation*; It is wrought by *Weight*; As in the ordinary Residence or Settlement of *Liquours*: By *Heat*: By *Motion*: By *Precipitation*, or *Sublimation*; (That is, a Calling of the severall Parts, either up, or downe, which is a kinde of *Attraction*:) By *Adhesion*; As when a Body more *Viscous* is mingled and agitated with the *Liquour*; which Viscous Body (afterwards severed) draweth with it the grosser Parts of the *Liquour*: And Lastly, By *Percolation* or *Passage*. 302

Secondly,

303 Secondly, for the *Even Distribution* of the *Spirits*; It is wrought By *Gentle Heat*; And By *Agitation* or *Motion*; (For of *Time* we speak not, because it is that, we would anticipate and represent:) And it is wrought also, By *Mixture* of some other *Body*, which hath a vertue to open the *Liquour*, and to make the *Spirits* the better passe thorow.

304 Thirdly, for the *Refining* of the *Spirit*, it is wrought likewise By *Heat*; By *Motion*; And By *Mixture* of some *Body* which hath *Vertue to attenuate*. So therefore (having shewen the *Causes*) for the *Accelerating* of *Clarification*, in generall, and the *Enducing* of it; take these *Instances*, and *Trials*.

305 It is in common Practice, to draw *Wine*, or *Beere*, from the *Lees*, (which we call *Racking*;) whereby it will *Clarifie* much the sooner: For the *Lees*, though they keep the *Drink* in Heart, and make it lasting; yet withall they cast up some Spissitude: And this *Instance* is to be referred to *Separation*.

306 On the other side, it were good to trie, what the Adding to the *Liquour* more *Lees* than his owne will worke; For though the *Lees* doe make the *Liquour* turbide, yet they refine the *Spirits*. Take therefore a Vessell of *New Beere*; And take another Vessell of *New Beere*, and Rack the one Vessel from the *Lees*, and powre the *Lees* of the Racked Vessell into the unracked Vessell, and see the Effect: This *Instance* is referred to the *Refining* of the *Spirits*.

307 Take *New Beere*, and put in some Quantitie of *Stale Beere* into it, and see whether it will not accelerate the *Clarification*, by Opening the Body of the *Beere*, and Cutting the Grosser Parts, whereby they may fall down into *Lees*. And this *Instance* again is referred to *Separation*.

308 The longer *Malt*, or *Herbs*, or the like, are Infused in *Liquour*, the more thick and troubled the *Liquour* is; But the longer they be decocted in the *Liquour*, the clearer it is. The reason is plaine, because in *Infusion*, the longer it is, the greater is the Part of the Grosse Body, that goeth into the *Liquour*: But in *Decoction*, though more goeth forth, yet it either purgeth at the Top, or settleth at the Bottome. And therfore the most Exact Way to *Clarifie* is; First to *Infuse*, and then to take off the *Liquour*, and *Decoct* it; as they doe in *Beere*, which hath *Malt* first infused in the *Liquour*, and is afterwards boiled with the Hop. This also is referred to *Separation*.

309 Take *Hot Embers*, and put them about a Bottle filled with *New Beere*, almost to the very Neck: Let the Bottle be well stopped, lest it flie out: And continue it, renewing the *Embers* every day, by the space of Ten Dayes; and then compare it with another Bottle of the same *Beer* set by. Take also Lime both *Quenched*, and *Unquenched*, and set the Bottles in them, *ut suprà*. This *Instance* is referred, both to the *Even Distribution*, and also to the *Refining* of the *Spirits* by *Heat*.

310 Take *Bottles*, and *Swing* them; Or *Carry* them in a *Wheele-Barrow*, upon *Rough Ground*; twice in a day: But then you may not fill the *Bottles* full, but leave some Aire; For if the *Liquour* come close to the Stopple, it cannot play, nor flower: And when you have shaken them well, either way, poure the *Drinke* into another Bottle, stopped close, after the usuall manner; For if it stay with much Aire in it, the *Drinke* will pall; neither will it settle so perfectly in all the Parts. Let it stand some 24 houres: Then take it, and put it again into a *Bottle* with *Aire*, *ut suprà*: And thence into a *Bottle Stopped ut suprà*: And so repeat the same *Operation* for seven dayes. Note that in the Emptying of one Bottle into another, you must doe it swiftly, lest the *Drinke* pall. It were good also, to trie it in a *Bottle* with a little Aire below the Neck, without Emptying. This *Instance* is referred to the *Even Distribution* and *Refining* of the *Spirits* by *Motion*.

As

As for *Percolation*, *Inward*, and *Outward*, (which belongeth to *Separation*,) Triall would be made, of *Clarifying* by *Adhesion*, with *Milke* put into *New-Beere*, and stirred with it: For it may be that the Grosser Part of the *Beere* will cleave to the *Milke*: The Doubt is, whether the *Milke* will sever well againe; Which is soone tried. And it is usuall in *Clarifying Ippocrasse* to put in *Milke*; Which after severeth and carrieth with it the *Grosser Parts* of the *Ippocrasse*, as hath beene said elsewhere. Also for the better *Clarification* by *Percolation*, when they tun *New Beere*, they use to let it passe through a *Strainer*; And it is like the finer the *Strainer* is, the clearer it will be. 311

The *Accelerating* of *Maturation* we will now enquire of. And of *Maturation* it selfe. It is of three Natures. The *Maturation* of *Fruits*: The *Maturation* of *Drinkes*: And the *Maturation* of *Impostumes*, and *Vlcers*. This last we referre to another Place, where we shall handle *Experiments Medicinall*. There be also other *Maturations*, as of *Metals*, &c. whereof we will speake as Occasion serveth. But we will begin with that of *Drinkes*, because it hath such Affinitie with the *Clarification* of *Liquours*.

Experiments in Consort touching *Maturation*, and the *Accelerating* thereof. And first touching the *Maturation* and *Quickening* of *Drinks*. And next touching the *Maturation* of *Fruits*.

For the *Maturation* of *Drinks*, it is wrought by the *Congregation* of the *Spirits* together, whereby they digest more perfectly the Grosser Parts: And it is effected partly, by the same meanes, that *Clarification* is, (whereof we spake before;) But then note, that an Extreme *Clarification* doth spread the *Spirits* so Smooth, as they become Dull, and the *Drink* dead, which ought to have a little Flouring. And therefore all your Cleare *Amber Drinke* is flat. 312

Wee see the *Degrees* of *Maturation* of *Drinkes*; In *Must*; In *Wine*, as it is drunke; And in *Vinegar*. Whereof *Must* hath not the *Spirits* well Congregated; *Wine* hath them well united; so as they make the Parts somewhat more Oylie: *Vinegar* hath them Congregated, but more Jejune, and in smaller Quantity; The greatest and finest Spirit and Part being exhaled: For we see *Vinegar* is made by setting the Vessell of *Wine* against the hot Sunne: And therefore *Vinegar* will not burne; For that much of the Finer Parts is exhaled. 313

The *Refreshing* and *Quickning* of *Drinke* Palled, or Dead, is by *Enforcing* the *Motion* of the *Spirit*: So we see that *Open Weather* relaxeth the *Spirit*, and maketh it more lively in *Motion*. We see also *Bottelling* of *Beere*, or *Ale*, while it is New, and full of *Spirit*, (so that it spirteth when the Stopple is taken forth) maketh the *Drinke* more quick and windie. A *Pan* of *Coales* in the *Cellar* doth likewise good, and maketh the *Drinke* worke againe. *New Drink* put to *Drinke* that is *Dead*, provoketh it to worke againe: Nay, which is more, (as some affirme,) *A Brewing of New Beere*, set by *Old Beere*, maketh it worke againe. It were good also to *Enforce* the *Spirits* by some *Mixtures*, that may excite and quicken them; As by putting into the *Bottles*, *Nitre*, *Chalke*, *Lime*, &c. We see *Creame* is *Matured*, and made to rise more speedily, by Putting in *Cold Water*; which, as it seemeth, getteth downe the *Whey*. 314

It is tried, that the *Burying* of *Bottles of Drinke* well stopped, either in *drie Earth*, a good depth; Or in the *Bottome* of a *Well within Water*; And best of all the *Hanging* of them in a *deepe Well* somewhat *above the Water*, for some fortnights space, is an Excellent *Meanes* of making *Drinke* fresh, and quick 315

quick: for the *Cold* doth not cause any Exhaling of the *Spirits* at all; As *Heat* doth, though it rarifieth the rest that remaine: But *Cold* maketh the *Spirits* vigorous, and irritateth them, whereby they incorporate the Parts of the *Liquour* perfectly.

316 As for the *Maturation of Fruits*; Itis wrought by the *Calling forth of the Spirits of the Body outward*, and so *Spreading* them more *smoothly*: And likewise by *Digesting*, in some degree, *the Grosser Parts*: And this is Effected, by *Heat*; *Motion*; *Attraction*; And by a *Rudiment* of *Putrefaction*: For the Inception of *Putrefaction* hath in it a *Maturation*.

317 There were taken *Apples*, and laid in *Straw*; In *Hay*; In *Flower*; In *Chalke*; In *Lime*; Covered over with *Onions*; Covered over with *Crabs*; Closed up in *Wax*; Shut in a *Box*: &c. There was also an *Apple* hanged up in *Smoake*: Of all which the *Experiment* sorted in this Manner.

318 After a Moneths Space, the *Apple* Enclosed in *Wax*, was as Greene and Fresh as at the first Putting in, and the *Kernells* continued White. The *Cause* is, for that all *Exclusion* of *Open Aire*, (which is ever Predatory) maintaineth the Body in his first Freshnesse, and Moisture: But the Inconvenience is, that it tasteth a little of the *Wax*: Which, I suppose, in a *Pomgranate*, or some such thick-coated *Fruit*, it would not doe.

319 The *Apple* Hanged in the *smoake*, turned like an Old Mellow *Apple*, Wrinkled, Drie, Soft, Sweet, Yellow within. The *Cause* is, for that such a degree of *Heat*, which doth neither Melt, nor Scorch, (For we see that in a greater *Heat*, a *Roast Apple* Softneth and Melteth, And *Pigs feet*, made of Quarters of *Wardens*, scorch and have a skinne of Cole) doth Mellow, and not Adure: The *Smoake* also maketh the *Apple* (as it were) sprinkled with *Soot*, which helpeth to *Mature*. We see that in *Drying* of *Peares*, and *Prunes*, in the Oven, and Removing of them often as they begin to Sweat, there is a like Operation; But that is with a farre more Intense degree of *Heat*.

320 The *Apples* covered in the *Lime* and *Ashes*, were well *Matured*; As appeared both in their Yellownesse, and Sweetnesse. The *Cause* is, for that that *Degree of Heat* which is in *Lime*, and *Ashes*, (being a Smoothering *Heat*) is of all the rest most Proper; for it doth neither Liquefie, nor Arefie; And that is true *Maturation*. Note that the Taste of those *Apples* was good; And therefore it is the *Experiment* fittest for Use.

321 The *Apples*, *Covered* with *Crabs*, and *Onions*, were likewise well *Matured*. The Cause is, not any *Heat*; But for that the *Crabs* and the *Onions* draw forth the *Spirits* of the *Apple*, and spread them equally thorowout the *Body*; which taketh away Hardnesse. So we see one *Apple* ripeneth against another. And therefore in making of *Cider*, they turne the *Apples* first upon a heape. So one *Cluster* of *Grapes*, that toucheth another whilest it groweth, ripeneth faster; *Botrus contra Botrum citius maturescit*.

322 The *Apples* in *Hay*, and the *Straw*, ripened apparently, though not so much as the Other; But the *Apple* in the *Straw* more. The *Cause* is, for that the *Hay* and *Straw* have a very low degree of *Heat*, but yet Close and Smoothering, and which drieth not.

323 The *Apple* in the *Close Box*, was ripened also: The *Cause* is, for that all Aire, kept close, hath a degree of *Warmth*: As we see in *Wooll*, *Furre*, *Plush*, &c. *Note that all these were Compared with another* Apple, *of the same kind*, *that lay of it Selfe*: *And in Comparison of that*, *were more Sweet*, *and more Yellow*, *and so appeared to be more Ripe*.

324 Take an *Apple*, or *Peare*, or other like *Fruit*, and *Rowle* it upon a Table hard: Wee see in Common Experience, that the *Rowling* doth Soften and Sweeten

Sweeten the *Fruit* presently; Which is Nothing but the *Smooth Distribution* of the *Spirits* into the Parts; For the *Vnequall Distribution* of the *Spirits* maketh the Harrishnesse: But this Hard *Rowling* is betweene *Concoction*, and a *Simple Maturation*; Therfore, if you should *Rowle* them but gently, perhaps twice a day; And continue it some seven dayes, it is like they would *mature* more finely, and likeunto the *Naturall Maturation*.

Take an *Apple*, and cut out a Peece of the Top, and cover it, to see whether that *Solution of Continuitie* will not hasten a *Maturation*: We see that where a *Waspe*, or a *Flie*, or a *Worme* hath bitten, in a *Grape*, or any *Fruit*, it will sweeten hastily. 325

Take an *Apple*, &c. and prick it with a *Pin* full of *Holes*, not deep, and smear it a little with *Sacke*, or *Cinnamon Water*, or *Spirit of Wine*, every day for ten dayes, to see if the *Virtuall Heat* of the *Wine*, or *Strong Waters*, will not *Mature* it. 326

In these Trialls *also, as was used in the first, set another of the same* Fruits *by, to Compare them: And trie them, by their* Yellownesse, *and by their* Sweetnesse.

Experiment Solitary, touching the *Making* of *Gold*.

The World hath been much abused by the Opinion of *Making of Gold*: The *Worke* it selfe I judge to be possible; But the *Meanes* (hitherto propounded) to effect it, are, in the Practice, full of Errour and Imposture; And in the Theory, full of unsound Imaginations. For to say, that *Nature* hath an Intention to make all Metals *Gold*; And that, if she were delivered from Impediments, shee would performe her owne Worke; And that, if the Crudities, Impurities, and Leprosities of *Metals* were cured, they would become *Gold*; And that a little *Quantity* of the *Medicine*, in the Worke of *Projection*, will turne a Sea of the *Baser Metall* into *Gold*, by *Multiplying*: All these are but dreames: And so are many other Grounds of *Alchymy*. And to help the Matter, the *Alchymists* call in likewise many Vanities, out of *Astrology*; *Naturall Magicke*; Superstitious Interpretations of *Scriptures*; Auricular *Traditions*; Faigned Testimonies of *Ancient Authors*; And the like. It is true, on the other side, they have brought to light not a few profitable *Experiments*, and thereby made the World some amends. But we, when we shall come to handle the *Version* & *Transmutation* of *Bodies*; And the *Experiments* concerning *Metals*, and *Mineralls*; will lay open the true Wayes and Passages of *Nature*, which may lead to this great Effect. And we commend the wit of the *Chineses*, who despaire of Making of *Gold*, but are Mad upon the Making of *Silver*: For certain it is, that it is more difficult to make *Gold*, (which is the most Ponderous and Materiate amongst *Metalls*) of other *Metalls*, lesse Ponderous, and lesse Materiate; than (*viâ versâ*) to make *Silver* of *Lead*, or *Quick-Silver*; Both which are more Ponderous than *Silver*; So that they need rather a further

ther Degree of *Fixation*, than any *Condensation*. In the meane time, by Occasion of Handling the *Axiomes* touching *Maturation*, we will direct a *Triall* touching the *Maturing* of *Metalls*, and thereby turning some of them into *Gold*: For wee conceive indeed, that a perfect good *Concoction*, or *Disgestion*, or *Maturation* of some *Metalls*, will produce *Gold*. And here wee call to minde, that we knew a *Dutch-man*, that had wrought himselfe into the beleefe of a great Person, by undertaking that he could make *Gold*: Whose discourse was, that *Gold* might be made; But that the *Alchymists* Over-fired the Worke: For (he said) the *Making* of *Gold* did require a very temperate *Heat*, as being in *Nature* a Subterrany worke, where little *Heat* commeth; But yet more to the *Making* of *Gold*, than of any other *Metall*; And therefore, that he would doe it with a great Lamp, that should carry a Temperate and Equall Heat: And that it was the Work of many Moneths. The Device of the Lampe was folly; But the Over-firing now used; And the Equall Heat to be required; And the Making it a Worke of some good Time; are no ill Discourses.

We resort therefore to our *Axiomes* of *Maturation*, in Effect touched before. The First is, that there be *used a Temperate Heat*; For they are ever *Temperate Heats* that *Disgest*, and *Mature*: Wherein we meane *Temperate*, according to the *Nature* of the *Subject*; For that may be *Temperate* to *Fruits*, and *Liquours*, which will not worke at all upon *Metalls*. The Second is, that the *Spirit of the Metall be quickened*, and the *Tangible Parts opened*: For without those two Operations, the *Spirit* of the *Metall*, wrought upon, will not be able to disgest the parts. The Third is, that the *Spirits doe spread themselves Even*, and *move not Subsultorily*; For that will make the Parts Close, and Pliant. And this requireth a Heat, that doth not rise and fall, but continue as *Equall* as may be. The Fourth is, that *no Part of the Spirit be emitted, but detained*: For if there be *Emission* of *Spirit*, the Body of the *Metall* will be Hard, and Churlish. And this will be performed, partly by the Temper of the Fire; And partly by the closenesse of the Vessell. The Fifth is, that there be *Choice made of the likeliest and best prepared Metall, for the Version*: For that will facilitate the Worke. The Sixth is, that you give *Time enough for the Worke*: Not to prolong Hopes (as the Alchymists doe;) but indeed to give *Nature* a convenient Space to worke in. These Principles are most certaine, and true;

Wee

We will now derive a direction of *Triall* out of them; Which may (perhaps) by further Meditation, be improved.

Let there be a *Small Furnace* made, of a *Temperate Heat*; Let the *Heat* be such, as may keep the *Metall perpetually Moulten*, and no more; For that above all importeth to the Work. For the Materiall, take *Silver*, which is the *Metall* that in Nature Symbolizeth most with *Gold*; Put in also, with the *Silver*, a Tenth Part of *Quick-silver*, and a Twelfth Part of *Nitre*, by weight; Both these to quicken and open the Body of the *Metall*: And so let the Worke be continued by the *Space of Sixe Moneths*, at the least. I wish also, that there be, at some times, an Injection of some *Oyled* Substance; Such as they use in the Recovering of *Gold*, which by Vexing with Separations hath beene made Churlish: And this is, to lay the Parts more Close and Smooth, which is the Maine Work. For *Gold* (as we see) is the Closest (and therefore the Heaviest) of *Metalls*: And is likewise the most Flexible, and Tensible. Note, that to thinke to make *Gold* of *Quick-silver*, because it is the heaviest, is a Thing not to bee hoped; For *Quick-silver* will not endure the Mannage of the *Fire*. Next to *Silver*, I thinke *Copper* were fittest to bee the *Materiall*. 327

Experiment Solitary touching the *Nature* of *Gold*.

Gold hath these *Natures*: *Greatnesse of Weight*; *Closenesse of Parts*; *Fixation*; *Pliantnesse*, or *Softnesse*; *Immunitie from Rust*; *Colour* or *Tincture of Yellow*. Therefore the Sure Way, (though most about,) to make *Gold*, is to know the *Causes* of the Severall *Natures* before rehearsed, and the *Axiomes* concerning the same. For if a man can make a *Metall*, that hath all these *Properties*, Let men dispute, whether it be *Gold*, or no? 328

Experiments in Consort, touching the *Enducing* and *Accelerating* of *Putrefaction*.

The *Enducing* and *Accelerating* of *Putrefaction*, is a Subject of a very Universall Enquiry: For *Corruption* is a Reciprocall to *Generation*: And they Two, are as *Natures* two *Termes* or *Bundaries*; And the *Guides* to *Life* and *Death*. *Putrefaction* is the Worke of the *Spirits* of *Bodies*, which ever are Unquiet to *Get forth*, and *Congregate* with the *Aire*, and to enjoy the *Sunbeames*. The *Getting forth*, or Spreading of the *Spirits*, (which is a Degree of *Getting forth*,) hath five Differing *Operations*. If the *Spirits* be detained within the Bodie, and move more violently, there followeth *Colliquation*; As in *Metalls*, &c. If more Mildely, there followeth *Disgestion*, or *Maturation*; As in *Drinkes*, and *Fruits*. If the *Spirits* be not meerly Detained, but Protrude a little, and that Motion be Confused, and inordinate, there followeth *Putrefaction*; Which ever dissolveth the Consistence of the Body into much Inequalitie; As in *Flesh*, *Rotten Fruits*, *Shining Wood*, &c. And also in the *Rust* of *Metalls*. But if that Motion be in a certain Order, there followeth *Vivification*, and *Figuration*; As both in *Living Creatures* bred of *Putrefaction*, and in *Living Creatures Perfect*. But if the *Spirits* issue out of

the Body, there followeth *Desiccation*, *Induration*, *Consumption*, &c. As in *Bricke*, evaporation of *Bodies Liquid*, &c.

329 The *Meanes* to *Enduce* and *Accelerate Putrefaction*, are; First by *Adding some Crude or Watry Moisture*; As in Wetting of any Flesh, Fruit, Wood, with *Water*, &c. For contrariwise *Vnctuous* and *Oyly Substances* preserve.

330 The Second is by *Invitation* or *Excitation*; As when a *Rotten Apple* lyeth close to another *Apple* that is *Sound*: Or when *Dung* (which is a Substance already Putrified) is added to other Bodies. And this is also notably seene in *Church-yards*, where they bury much; Where the Earth will consume the *Corps*, in farre shorter time, than other Earth will.

331 The Third is, by *Closenesse*, and *Stopping*, which *detaineth* the *Spirits*, *in Prison*, more than they would; And thereby irritateth them to seeke Issue; As in Corne, and Cloaths, which waxe Musty; and therefore Open Aire, (which they call *Aer perflabilis*) doth preserve: And this doth appeare more evidently in *Agues*, which come (most of them,) of *Obstructions*, and *Penning* the *Humours*, which thereupon *Putrifie*.

332 The Fourth is, by *Solution of Continuitie*; As we see an Apple will rot sooner, if it be Cut or Pierced; And so will Wood, &c. And so the Flesh of Creatures alive, where they have received any Wound.

333 The Fifth is, either by the *Exhaling*, or by the *Driving back* of the *Principall Spirits*, which preserve the Consistence of the *Body*; So that when their Government is dissolved, every *Part* returneth to his Nature, or Homogeny. And this appeareth in *Vrine*, and *Bloud*, when they coole, and thereby breake; It appeareth also in the *Gangrene*, or *Mortification* of *Flesh*, either by *Opiates*, or by *Intense Colds*. I conceive also the same Effect is in *Pestilences*, for that the *Malignitie* of the *Infecting Vapour*, daunceth the *Principall Spirits*, and maketh them flie, and leave their *Regiment*; And then the *Humours*, *Flesh*, and *Secondary Spirits*, doe dissolve, and breake, as in an *Anarchy*.

334 The Sixth is, when a *Forraine Spirit*, *Stronger and more Eager than the Spirit of the Body*, *entreth the Body*; As in the Stinging of Serpents. And this is the *Cause* (generally) that upon all *Poysons* followeth *Swelling*: And we see *Swelling* followeth also, when the *Spirits* of the *Body* it self, Congregate too much; As upon *Blowes*, and *Bruises*; Or when they are *Pent in too much*, as in *Swelling* upon *Cold*. And we see also, that the *Spirits* coming of *Putrefaction* of *Humours* in *Agues*, &c. Which may bee counted as *Forraine Spirits*, though they be bred within the Body, do Extinguish and Suffocate the *Naturall Spirits*, and *Heat*.

335 The Seventh is, by such a *Weak Degree of Heat*, *as setteth the Spirits in a little Motion*, *but is not able*, *either to disgest the Parts*, *or to Issue the Spirits*; As is seene in Flesh kept in a Roome that is not Coole; Whereas in a Cooleand Wet Larder it will keep longer. And we see, that *Vivification* (whereof *Putrefaction* is the *Bastard Brother*,) is effected by such Soft Heats; As the Hatching of Egges; The Heat of the Wombe, &c.

336 The Eight is, by the *Releasing of the Spirits*; which before were close kept by the Solidnesse of their Coverture, and thereby their Appetite of Issuing checked; As in the *Artificiall Rusts* induced by strong Waters, in *Iron*, *Lead*, &c. And therefore *Wetting* hasteneth *Rust*, or *Putrefaction* of any thing, because it softneth the Crust, for the *Spirits* to come forth.

337 The Ninth is, by the *Enterchange of Heat and Cold*, or *Wet and Dry*; As we see in the Mouldring of Earth in Frosts, and Sunne; And in the more hasty Rotting of Wood, that is sometimes wet, sometimes dry.

The

The Tenth is, by *Time, and the Worke and Procedure of the Spirits themselves*, which cannot keep their Station; Especially if they be left to themselves; And there be not Agitation or Locall Motion. As we see in Corn not stirred; And Mens Bodies not exercised. 338

All *Moulds* are Inceptions of *Putrefaction*; As the *Moulds* of *Pyes*; and *Flesh*; the *Moulds* of *Orenges*, and *Limons*; which *Moulds* afterwards turn into Wormes, or more odious *Putrefactions*: And therefore (commonly) prove to be of ill Odour. And if the Body be Liquid, and not apt to putrifie totally, it will cast up a *Mother* in the Top; As the *Mothers* of *Distilled Waters*. 339

Mosse is a Kinde of *Mould*, of the Earth, and Trees. But it may be better sorted as a *Rudiment* of *Germination*; To which we referre it. 340

Experiments in Consort, touching *Prohibiting* and *Preventing Putrefaction*.

It is an *Enquiry* of Excellent use, to Enquire of the *Meanes* of *Preventing* or *Staying* of *Putrefaction*; For therein consisteth the *Meanes* of *Conservation* of *Bodies*; For *Bodies* have two Kindes of *Dissolutions*; The one by *Consumption*, and *Desiccation*; The other by *Putrefaction*. But as for the *Putrefactions* of the *Bodies* of *Men*, and *Living Creatures* (as in Agues, Worms, Consumptions of the Lungs, Impostumes, and Ulcers both Inwards and outwards,) they are a great *Part of Physicke*, and *Surgery*; And therefore we will reserve the *Enquiry* of them to the proper Place, where wee shall handle *Medicinall Experiments* of all Sorts. Of the rest wee will now Enter into an Enquiry: wherein much light may be taken, from that which hath beene said, of the *Meanes* to *Enduce* or *Accelerate Putrefaction*: For the Removing that, wich caused *Putrefaction*, doth Prevent and Avoid *Putrefaction*.

The First *Meanes* of *Prohibiting* or *Checking Putrefaction*, is *Cold*: For so we see that Meat and Drink will last longer, Unputrified, or Unsowred, in Winter, than in Summer: And we see that Flowers, and Fruits, put in Conservatories of Snow, keep fresh. And this worketh by the *Detention* of the *Spirits*, and *Constipation* of the *Tangible Parts*. 341

The Second is *Astriction*: For *Astriction* prohibiteth *Dissolution*: As we see (generally) in *Medicines*, whereof such as are *Astringents* doe inhibite *Putrefaction*: And by the same reason of *Astringency*, some small Quantity of Oile of Vitrioll, will keep Fresh Water long from *Putrefying*. And this *Astriction* is in a Substance that hath a *Virtuall Cold*; And it worketh (partly) by the same Meanes that Cold doth. 342

The Third is, the Excluding of the *Aire*; And againe, the *Exposing to the Aire*: For these Contraries, (as it commeth oftento passe,) worke the same Effect, according to the Nature of the Subject Matter. So we see, that *Beere*, or *Wine*, in Bottles close stopped, last long; That the *Garners under Ground* keepe Corne longer than those above Ground; And that *Fruit closed in Wax* keepeth fresh: And likewise *Bodies* put in *Honey*, and *Flower*, keepe more fresh: And *Liquours*, *Drinkes*, and *Iuices*, with a little *Oyle* cast on the Top, keepe fresh. Contrariwise, we see that *Cloth* and *Apparell*, not *Aired*, doe breed Moathes, and Mould; and the Diversitie is, that in *Bodies* 343

that need *Detention* of *Spirits*, the *Exclusion of the Aire* doth good; As in *Drinkes*, and *Corne*: But in *Bodies* that need *Emission* of *Spirits*, to discharge some of the Superfluous Moisture, it doth hurt, for they require *Airing*.

344 The fourth is *Motion*, and *Stirring*; For *Putrefaction* asketh *Rest*; For the Subtill *Motion*, which *Putrefaction* requireth, is disturbed by any *Agitation*; And all *Locall Motion* keepeth *Bodies* Integrall, and their Parts together; As wee see that Turning over of Corne in a Garner; Or Letting it runne like an Houre-glasse, from an upper Roome into a Lower, doth keepe it Sweet: And Running Waters putrifie not: And in Mens Bodies, Exercise hindreth *Putrefaction*; And contrariwise *Rest*, and Want of *Motion*, or Stoppings, (whereby the Runne of Humours, or the Motion of Perspiration, is stayed,) further *Putrefaction*; As we partly touched a little before.

345 The Fifth is, the *Breathing forth of the Adventitious Moisture in Bodies*; For as *Wetting* doth hasten *Putrefaction*; So *Convenient Drying*, (whereby the more *Radicall Moisture* is onely kept in,) putteth back *Putrefaction*: So we see that *Herbs*, and *Flowers*, if they be dried in the Shade; or dried in the hot Sunne, for a small time, keep best. For the *Emission* of the *Loose* and *Adventitious Moisture*, doth betray the *Radicall Moisture*; And carryeth it out for Company.

346 The Sixth is, the *Strengthening of the Spirits of Bodies*; For as a *Great Heat* keepeth Bodies from *Putrefaction*; But a *Tepide Heat* enclineth them to *Putrefaction*: So a Strong *Spirit* likewise preserveth, and a Weake or Faint *Spirit* disposeth to *Corruption*. So we finde that Salt water corrupteth not so soon as Fresh: And Salting of Oisters, and Powdring of Meat, keepeth them from *Putrefaction*. It would be tried also, whether *Chalke* put into *Water*, or *Drinke*, doth not preserve it from *Putrefying*, or speedy Souring. So wee see that *Strong Beere* will last longer than Small; And all Things, that are Hot and Aromaticall, doe helpe to Preserve Liquours, or Powders, &c. Which they doe, as well by Strengthening the *Spirits*, as by Soaking out the loose *Moisture*.

347 The Seventh is, *Separation of the Cruder Parts*, and thereby *making the Body more Equall*; for all unperfect Mixture is apt to *Putrefie*; And Watry Substances are more apt to *Putrefie*, than Oyly. So wee see Distilled Waters will last longer than Raw waters; And Things that have passed the Fire, doe last longer than those that have not passed the Fire; as Dried Peares, &c.

348 The Eighth is, the *Drawing forth continually of that part, where the Putrefaction beginneth*: Which is (commonly) the *Loose and Watry Moisture*; Not onely for the Reason before given, that it provoketh the *Radicall Moisture* to come forth with it; But because being detained in the Body, the *Putrefaction* taking hold of it, infecteth the rest: As we see in the *Embalming of dead Bodies*: And the same Reason is of *Preserving Herbs*, or *Fruits*, or *Flowers*, in *Branne*, or *Meale*.

349 The Ninth is, the *Commixture of any Thing that is more Oily*, or *Sweet*: For such *Bodies* are lest apt to *Putrefie*, the *Aire* working little upon them; And they not putrefying preserve the rest. And therefore we see *Syrrups*, and *Ointments*, will last longer, than *Iuyces*.

350 The Tenth is, the *Commixture of somewhat that is Drie*; For *Putrefaction* beginneth first from the *Spirits*; And then from the *Moisture*: And that that is dry is unapt to putrefie: And therefore Smoake preserveth Flesh; As wee see in Bacon, and Neats-Tongues, and Martlemas Beefe, &c.

The

The Opinion of some of the *Ancients*, that *Blowne Aires* doe preserve Bodies, longer than other *Aires*, seemeth to Mee Probable; For that the *Blowne Aires*, being Over-charged and Compressed, will hardly receive the Exhaling of any Thing, but rather repulse it. It was tried in a *Blowne Bladder*, whereinto Flesh was put, and likewise a Flower, and it sorted not: For *Dry Bladders* will not *Blow*: And *New Bladders* rather further *Putrefaction*: The way were therefore, to blow strongly, with a Paire of Bellowes, into a Hogshead, putting into the Hogshead (before) that which you would have preserved; And in the instant that you withdraw the Bellowes, stop the Hole close. 351

Experiment Solitary touching *Wood Shining* in the *Darke*.

THe *Experiment* of *Wood* that *Shineth* in the *Darke*, we have diligently driven, and pursued: The rather, for that of all Things, that give Light here below, it is the most Durable; And hath least Apparent Motion. *Fire* and *Flame* are in continuall Expence; *Sugar* shineth only while it is in Scraping; And *Salt-water* while it is in Dashing; *Glow-wormes* have their Shining while they live, or a little after; Onely *Scales* of *Fishes* (Putrified) seeme to be of the same Nature with *Shining Wood*: And it is true, that all *Putrefaction* hath with it an Inward Motion, as well as *Fire*, or *Light*. The *Triall* sorted thus. 1. The *Shining* is in some Peeces more *Bright*, in some more *Dimme*; but the most *Bright* of all doth not attaine to the Light of a *Glow-worme*. 2. The *Woods* that have beene tried to shine, are chiefly *Sallow*, and *Willow*; Also the *Ash*, and *Hasle*; It may be, it holdeth in others. 3. Both *Roots*, and *Bodies* doe shine, but the *Roots* better. 4. The *Colour* of the *Shining Part*, by Daylight, is in some Peeces *White*, in some Peeces inclining to *Red*; Which in the Countrey they call the *White*, and *Red Garret*. 5. The Part that Shineth, is, (for the most Part) somewhat *Soft*, and *Moist* to feele to; But some was found to be *Firme* and *Hard*; So as it might be figured into a Crosse, or into Beads, &c. But you must not look to have an Image, or the like, in any Thing that is Lightsome; For even a face in Iron red Hot will not be seen, the Light confounding the small differences of Lightsome and Darksome, which shew the figure. 6. There was the *Shining Part pared off*, till you came to that, that did not Shine; But within two Dayes the *Part Contiguous* began also to *Shine*, being laid abroad in the Dew; So as it seemeth the Putrefaction spreadeth. 7. There was other dead *Wood* of like kinde, that was *Laid abroad*, which *Shined* not at the first; But after a Nights lying abroad began to *Shine*. 8. There was other *Wood*, that did *First Shine*; And being laid drie in the House, within five or sixe dayes, *Lost* the *Shining*; And laid abroad again, *Recovered* the *Shining*. 9. *Shining Woods*, being laid in a *Dry Roome*, within a Seven night, lost their Shining; But being laid in a *Cellar*, or *Danke Roome*, kept the *Shining*. 10. The *Boring of Holes*, in that kinde of Wood, and then laying it abroad, seemeth to conduce to make it *Shine*: The *Cause* is, for that all *Solution* of *Continuity* doth help on *Putrefaction*, as was touched before. 11. No *Wood* hath beene yet tried to *Shine*, that was cut *downe alive*, but such as was *Rotted*, both in Stocke, and Root, while it grew. 12. Part of the *Wood* that *Shined*, was *steeped in Oyle*, and retained the *Shining* a Fortnight. 13. The like succeeded in some *Steeped* in *Water*, and much better. 14 How long the *Shining* will continue, if the *Wood* be *laid abroad every Night*, and *taken in* and *Sprinkled* with *Water* in the *Day*, is not yet tryed. 15. Triall was made of *laying it abroad in Frostie weather*, which hurt it not. 16. There was a great *Peece* of a *Root* which did shine, and the *Shining Part* was *Cut off*, till no more Shined; 352

Shined; Yet after two Nights, though it were kept in a drie Room, it got a *Shining*.

Experiment Solitary touching the *Acceleration* of *Birth*.

353

THe *Bringing forth* of *Living Creatures* may be *accelerated* in two Respects: The one, if the *Embryon ripeneth* and perfecteth sooner: The other, if there be some Cause from the *Mothers Body*, of *Expulsion* or Putting it downe: whereof the Former is good, and argueth Strength; The Latter is ill, and commeth by Accident or Disease. And therefore the Ancient *Observation* is true, that the *Childe borne in the Seventh Moneth*, doth commonly well; But *Borne in the Eighth Moneth*, doth (for the most part) die. But the *Cause* assigned is Fabulous; Which is, that in the Eighth Moneth, should be the returne of the Raigne, of the *Planet Saturne*: which (as they say) is a *Planet* Maligne; whereas in the Seventh is the Raigne of the *Moone*, which is a Planet Propitious. But the true *Cause* is, for that where there is so great a Prevention of the Ordinary time, it is the *lustinesse* of the *Childe*; But when it is lesse, it is some *indisposition* of the *Mother*.

Experiment Solitary touching the *Acceleration* of *growth* and *Stature*.

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TO *Accelerate Growth* or *Stature*, it must proceed; Either from the *Plenty* of the *Nourishment*; Or from the *Nature* of the *Nourishment*; Or from the *Quickening* and *Exciting* of the *Naturall Heat*. For the first, *Excesse* of *Nourishment* is hurtfull; For it maketh the Childe Corpulent; And Growing in Breadth, rather than in Height. And you may take an Experiment from *Plants*, which, if they spread much, are seldome tall. As for the *Nature* of the *Nourishment*; First, it may not be too *Drie*; And therefore Children in Dayrie Countries doe waxe more tall, than where they feed more upon Bread, and Flesh. There is also a received Tale; That boyling of *Daisie Roots* in *Milke* (which it is certain are great Driers) will make *Dogs* little. But so much is true, that an *Over-Drie Nourishment* in Childhood putteth backe Stature. Secondly, the *Nourishment* must be of an *Opening Nature*; For that Attenuateth the Juyce, and furthereth the Motion of the Spirits, upwards. Neither is it without cause, that *Xenophon*, in the *Nouriture* of the *Persian Children*, doth so much commend their Feeding upon *Cardamon*; which (he saith) made them grow better, aud bee of a more Active Habit. *Cardamon* is in Latine *Nasturtium*; And with us *Water-Cresses*; Which, it is certaine, is an Herbe, that whilest it is young, is Friendly to Life. As for the *Quickening* of *Naturall Heat*, it must be done chiefly with *Exercise*; And therefore (no doubt) much Going to Schoole, where they sit so much, hindreth the *Growth* of *Children*; whereas Countrey-People, that goe not to Schoole, are commonly of better Stature. And againe Men must beware how they give *Children*, any thing that is *Cold* in Operation; For even *Long Sucking* doth hinder both *Wit*, and *Stature*. This hath beene tryed, that a Whelpe, that hath beene fed with *Nitre* in *Milke*, hath become very little, but extreme lively: For the *Spirit* of *Nitre* is *Cold*. And though it be an Excellent Medicine, in Strength of yeares, for Prolongation of Life; yet it is, in Children and young Creatures, an Enemy to *Growth*: And all for the same Reason; For *Heat* is requisite to Growth: But after a Man is come to his Middle Age, *Heat* consumeth the Spirits; which the Coldnesse of the Spirit of *Nitre* doth helpe to condense, and correct.

Experiments in Consort touching *Sulphur* and *Mercury*, two of *Paracelsus* Principles.

There bee two *Great Families* of *Things*; You may terme them by severall Names; *Sulphureous* and *Mercureall*, which are the *Chymists* Words: (For as for their *Sal*, which is their Third Principle,

Principle, it is a Compound of the other two;)*Inflammable*, and *Not Inflammable*; *Mature* and *Crude*; *Oily* and *Watry*. For wee see that in *Subterranies* there are, as the *Fathers* of their *Tribes*, *Brimstone* and *Mercury*: In *Vegetables*, and *Living Creatures* there is *Water* and *Oile*: In the *Inferiour Order* of *Pneumaticalls* there is *Aire* and *Flame*: And in the *Superiour*, there is the *Body* of the *Starre*, and the *Pure Sky*. And these Paires, though they be unlike in the Primitive Differences of Matter, yet they seeme to have many Consents: For *Mercury* and *Sulphure* are principall Materialls of *Metalls*; *Water* and *Oyle*, are principall Materialls of *Vegetables*, and *Animals*; And seeme to differ but in *Maturation*, or *Concoction*: *Flame* (in Vulgar Opinion) is but *Aire Incensed*; And they both have Quicknesse of Motion, and Facilitie of Cession, much a like: And the *Interstellar Sky*, (though the Opinion be vaine, that the *Starre* is the *Denser Part* of his *Orbe*,) hath notwithstanding so much Affinity with the *Starre*, that there is a Rotation of that, as well as of the *Starre*. Therefore, it is one of the greatest *Magnalia Naturæ*, to turne *Water* or *Watry Iuyce* into *Oile* or *Oily* Juyce: Greater in Nature, than to turne *Silver*, or *Quick-silver*, into *Gold*.

The Instances we have, wherein *Crude* and *Watry* Substance turneth into *Fat* and *Oily*, are of foure kindes. First in the *Mixture* of *Earth* and *Water*; which mingled by the help of the Sunne, gather a Nitrous Fatnesse, more than either of them have severally; As we see, in that they put forth *Plants*, which need both Juyces. 355

The Second is in the *Assimilation* of *Nourishment*, made in the *Bodies* of *Plants*, and *Living Creatures*; Whereof *Plants* turne the Juyce of meere *Water* and *Earth*, into a great deale of *Oily Matter*: *Living Creatures*, though much of their *Fat*, and *Flesh*, are out of *Oily Aliments*, (as *Meat*, and *Bread*,) yet they Assimilate also in a Measure their *Drink* of *Water*, &c. But these two Wayes of *Version* of *Water* into *Oyle*, (namely by *Mixture*, and by *Assimilation*) are by many Passages, and Percolations, and by long Continuance of soft *Heats*, and by Circuits of Time. 356

The third is in the *Inception* of *Putrefaction*; As in *Water Corrupted*; And the *Mothers* of *Waters Distilled*; Both which have a kinde of *Fatnesse*, or *Oyle*. 357

The Fourth is in the *Dulcoration* of some *Metalls*; As *Saccharum Saturni*, &c. 358

The Intension of *Version* of *Water* into a more *Oyly Substance*, is by *Disgestion*; For *Oile* is almost Nothing else but *Water Disgested*; And this *Disgestion* is principally by *Heat*; Which *Heat* must be either *Outward*, or *Inward*: Againe, it may be by Provocation, or Excitation; Which is caused by the Mingling of Bodies already *Oily*, or *Disgested*; For they will somewhat Communicate their Nature with the rest. *Disgestion* also is strongly effected by direct *Assimulation*, of *Bodies Crude* into *Bodies Digested*; As in *Plants*, and *Living Creatures*, whose Nourishment is farre more Crude than their Bodies: 359

dies: But this *Disgestion* is by a great Compasse, as hath beene said. As for the more full Handling of these two Principles, whereof this is but a Taste; (the Enquiry of which is one of the Profoundest Enquiries of Nature,) We leave it to the *Title* of *Version* of *Bodies*; And likewise to the *Title* of the *First Congregations* of *Matter*; Which like a Generall Assembly of Estates, doth give Law to all *Bodies*.

Experiment Solitary touching *Chameleons*. 360

A *Chameleon* is a Creature about the Bignesse of an Ordinary *Lizard*: His Head unproportionably bigge; His eyes great: He mooveth his Head without the writhing of his Necke, (which is inflexible,) as a *Hogge* doth: His Backe crooked; His Skinne spotted with little Tumours, lesse Eminent nearer the Belly; His Taile slender, and long: On each Foot he hath five Fingers; three on the Outside, and two on the Inside; His Tongue of a marvellous Length in respect of his Body, and hollow at the end; which he will launch out to prey upon *Flies*. Of Colour Green, and of a dusky Yellow, brighter and whiter towards the Belly; Yet spotted with Blew, White, and Red. If he be laid upon Green, the Greene predominateth; If upon Yellow, the Yellow; Not so if he be laid upon Blew, or Red, or White; Onely the Greene Spots receive a more Orient Lustre; Laid upon Blacke, hee looketh all Blacke, though not without a Mixture of Greene. He feedeth not onely upon Aire, (though that be his principall Sustenance;) For sometimes he taketh *Flies*, as was said; Yet some that have kept *Chameleons* a whole yeare together, could never perceive that ever they fed upon any Thing else but Aire; And might observe their Bellies to swell after they had exhausted the Aire, and closed their Jawes; Which they open commonly against the Rayes of the Sunne. They have a foolish Tradition in *Magicke*, that if a *Chameleon* be burnt upon the Top of an House, it will raise a Tempest; Supposing (according to their vain Dreams of *Sympathies*) because he nourisheth with Aire, his Body should have great vertue to make Impression upon the Aire.

Experiment Solitary touching *Subterrany Fires*. 361

IT is reported by one of the *Ancients*, that in Part of *Media*, there are *Eruptions* of *Flames* out of *Plaines*; And that those *Flames* are cleare, and cast not forth such Smoake, and Ashes, and Pummice, as *Mountaine Flames* doe. The Reason (no doubt) is, because the *Flame* is not pent, as it is in *Mountains*, and *Earthquakes* which cast *Flame*. There be also some *Blinde Fires*, under *Stone*, which flame not out, but *Oile* being powred upon them, they flame out. The Cause whereof is, for that it seemeth, the *Fire* is so choaked, as not able to remove the Stone, it is *Heat*, rather than *Flame*; Which nevertheless is sufficient to Enflame the *Oile*.

Experiment Solitary touching *Nitre*. 362

IT is reported, that in some *Lakes*, the *Water* is so *Nitrous*, as if Foule Cloaths be put into it, it scoureth them of it selfe: And if they stay any whit long, they moulder away. And the scouring Vertue of *Nitre* is the more to be noted, because it is a *Body Cold*; And we see *Warme Water* scoureth better than *Cold*. But the Cause is, for that it hath a Subtill Spirit, which severeth and divideth any thing that is foule, and Viscous, and sticketh upon a Body.

Experiment Solitary touching *Congealing* of *Aire*. 363

TAke a *Bladder*, the greatest you can get; Fill it full of Winde, and tye it about the Neck with a Silke thred waxed; And upon that likewise Wax very close; So that when the Neck of the *Bladder* drieth, no *Aire* may possibly get in, nor out. Then bury it three or foure foot under the *Earth*, in a *Vault*, or in a *Conservatory* of *Snow*, the *Snow* being made hollow about the *Bladder*;

Bladder; And after some Fortnights distance, see whether the *Bladder* bee shrunke: For if it bee, then it is plaine, that the *Coldnesse* of the *Earth* or *Snow*, hath Condensed the *Aire*, and brought it a Degree nearer to *Water*: Which is an *Experiment* of great Consequence.

Experiment Solitary touching *Congealing* of *Water* into *Chrystall*. 364

IT is a Report of some good credit, that in *Deepe Caves*, there are *Pensile Chrystall*, and *Degrees* of *Chrystall* that drop from above; And in some other, (though more rarely) that rise from below. Which though it bee chiefly the Worke of Cold, yet it may be, that Water, that passeth thorow the Earth, gathereth a Nature more clammy, and fitter to Congeale, and becomes Solide, than Water of it selfe. Therefore Triall would bee made, to lay a Heape of Earth, in great Frosts, upon a Hollow Vessell, putting a Canvase betweene, that it falleth not in: And poure Water upon it, in such Quantity as will be sure to soake thorow; And see whether it will not make an harder Ice in the bottome of the Vessell, and lesse apt to dissolve, than ordinarily. I suppose also, that if you make the Earth narrower at the bottome, than at the Top, in fashion of a Sugar Loafe Reversed, it will help the Experiment. For it will make the Ice, where it Issueth, lesse in Bulk; And evermore Smalnesse of Quantity is a Helpe to *Version*.

Experiment Solitary touching *Preserving* of *Rose leaves* both in *Colour* and *Smell*. 365

TAke *Damaske Roses*, and pull them; Then drie them upon the Top of of an House, upon a Lead or Tarras, in the Hot Sunne, in a cleare day, between the Houres (onely) of twelve and two; or thereabouts. Then put them into a Sweet *Drie Earthen Bottle*, or a *Glasse* with narrow Mouthes, stuffing them close together, but without Bruising: Stop the *Bottle*, or *Glasse*, close, and these *Roses* will retaine, not onely their Smell Perfect, but their Colour fresh, for a yeare at least. Note, that Nothing doth so much destroy any Plant, or other body, either by *Putrefaction*, or *Arefaction*; as the *Adventitious Moisture*, which hangeth loose in the Body, if it be not drawne out. For it betrayeth and tolleth forth the *Innate* and *Radicall Moisture*, along with it, when it self goeth forth. And therefore in *Living Creatures*, Moderate Sweat doth preserve the Juyce of the Body. Note that these *Roses*, when you take them from the *Drying*, have little or no *Smell*; So that the Smell is a Second *Smell*, that issueth out of the *Flower* afterwards.

Experiments in Consort touching the *Continuance* of *Flame*. 366

THe *Continuance* of *Flame*, according unto the diversity of the *Body Enflamed*, and other Circumstances, is worthy the Enquiry; Chiefly, for that though *Flame* be (almost) of a Momentany Lasting, yet it receiveth the More, and the Lesse: we will first therefore speake (at large) of *Bodies Enflamed*, wholly, and Immediately, without any *Wieke* to helpe the *Inflammation*. A Spoonefull of *Spirit* of *Wine*, a little heated, was taken, and it burnt as long as came to 116. Pulses. The same Quantity of *Spirit* of *Wine*, Mixed with the Sixth Part of a Spoonefull of *Nitre* burnt but to the space of 94. Pulses. Mixed with the like Quantity of *Bay-salt*, 83. Pulses. Mixed with the like Quantity of *Gunpowder*, which dissolved into a Blacke water, 110 Pulses. A Cube, or Pellet of *Yellow Waxe*, was taken, as much as halfe the *Spirit* of *Wine*, and set in the Middest, and it burnt onely to the space of 87. Pulses. Mixed with the Sixth Part of a spoonefull of *Milke*, it burnt to the space of 100. Pulses; And the *Milke* was crudled. Mixed with the Sixth Part of a spoonefull of *Water*, it burnt to the space of 86. Pulses; With an *Equall Quantity* of *Water*, onely to the space of 4. Pulses. A small *Pebble* was laid in the Middest, and the *Spirit* of *Wine* burnt to the space of 94. Pulses.

Pulses. A Peece of *Wood*, of the Bignesse of an Arrow, and about a Fingers length, was set up in the Middest, and the *Spirit* of *Wine* burnt to the space of 94. Pulses. So that the *Spirit* of *Wine Simple*, endured the longest; And the *Spirit* of *Wine* with the *Bay-salt*, and the *Equall Quantity* of *Water*, were the shortest.

367 Consider well, whether the more speedy *Going forth of the flame*, be caused, by the *Greater Vigour* of the *Flame* in *Burning*; Or by the *Resistance* of the *Body mixed*, and the *Aversion* thereof to take *Flame*: Which will appeare by the Quantity of the *Spirit* of *Wine*, that remaineth after the Going out of the *Flame*. And it seemeth clearly to bee the latter; For that the Mixture of Things least apt to burne, is the Speediest in going out. And note, by the way, that *Spirit* of *Wine* burned, till it goe out of it self, will burne no more; And tasteth nothing so hot in the Mouth as it did; No nor yet sowre, (as if it were a degree towards *Vinegar*,) which *Burnt Wine doth*; but flat and dead.

368 Note, that in the *Experiment* of *Wax* aforesaid, the *Wax* dissolved in the burning, and yet did not incorporate it self, with the *Spirit* of *Wine*, to produce one *Flame*; but wheresoever the *Wax* floated, the *Flame* forsooke it, till at last it spread all over, and put the *Flame* quite out.

369 The *Experiments* of the *Mixtures* of the *Spirit* of *Wine enflamed*, are Things of discovery, and not of Use: But now we will speake of the *Continuance* of *Flames*, such as are used for *Candles*, *Lamps*, or *Tapers*; consisting of *Inflamable Matters*, and of a *Wieke* that provoketh *Inflamation*. And this importeth not onely Discovery, but also Use and Profit; For it is a great Saving in all such Lights, if they can be made as faire and right as others, and yet last longer. *Waxe Pure* made into a Candle, and *Waxe Mixed* severally into Candle-stuffe, with the Particulars that follow; (viz. *Water*, *Aqua-vitæ*, *Milke*, *Bay-salt*, *Oyle*, *Butter*, *Nitre*, *Brimstone*, *Saw-dust*,) Every of these bearing a Sixth Part to the *Wax*; And every of these *Candles Mixed*, being of the same Weight and Wieke, with the *Wax Pure*, proved thus in the Burning, and Lasting. The Swiftest in Consuming was that with *Saw-dust*; Which first burned faire till some part of the *Candle* was consumed, and the Dust gathered about the Snaste; But then it made the Snaste bigge, and long, and to burne duskishly, and the *Candle* wasted in halfe the time of the *Wax Pure*. The next in Swiftnesse, were the *Oyle*, and *Butter*, which consumed, by a Fifth part, swifter than the *Pure Wax*. Then followed in Swiftnesse the *Cleare Wax* it selfe. Then the *Bay-Salt*, which lasted about an Eighth part longer than the *Cleare Wax*. Then followed the *Aqua-vitæ*, which lasted about a Fifth part longer than the *Cleare Wax*. Then followed the *Milke*, and *Water*, with little difference from the *Aqua-vitæ*, but the *Water* slowest. And in these foure last, the *Wieke* would spit forth little Sparks. For the *Nitre*, it would not hold lighted above some Twelve Pulses: But all the while it would spit out Portions of *Flame*, which afterwards would go out into a vapour. For the *Brimstone*, it would hold lighted, much about the same with the *Nitre*; But then after a little while, it would harden and cake about the Snaste; So that the Mixture of *Bay-Salt* with *Wax*, will winne an Eighth part of the time of lasting, and the *Water* a Fifth.

370 After the Severall *Materialls* were tried, Triall was likewise made of severall *Wiekes*; As of Ordinary *Cotton*; *Sowing Thred*; *Rush*; *Silke*; *Straw*; and *Wood*. The *Silke*, *Straw*, and *Wood*, would flame a little, till they came to the *Wax*, and then goe out: of the Other Three, the *Thred* consumed faster than the *Cotten*, by a Sixth part of Time: The *Cotten* next: Then the *Rush* consumed

ſumed ſlower than the *Cotton*, by at leaſt a third part of time. For the Bigneſſe of the *Flame*, the *Cotton*, and *Thred*, caſt a *Flame* much alike; and the *Ruſh* much leſſe, and dimmer. *Quære*, whether *Wood*, and *Wiekes* both, as in *Torches*, conſume faſter, than the *Wiekes Simple?*

We have ſpoken of the Severall *Materialls*, and the Severall *Wiekes*: But to the *laſting* of the *Flame*, it importeth alſo; Not only what the *Materiall* is, but in the ſame *Materiall*, whether it be Hard, Soft, Old, New &c. Good *Houſwives*, to make their *Candles* burne the longer, uſe to lay them (one by one) in *Bran*, or *Flower*, which make them harder, and ſo they Conſume the ſlower: Inſomuch, as by this meanes, they will out-laſt other *Candles*, of the ſame ſtuffe, almoſt Halfe in Halfe. For *Bran* and *Flower* have a Vertue to Harden: So that both Age, and lying in the Bran, doth help to the Laſting. And wee ſee that *Wax Candles* laſt longer than *Tallow Candles*, becauſe *Wax* is more firme, and hard. 371

The *Laſting* of *Flame* alſo dependeth upon the *eaſie Drawing* of the *Nouriſhment*; As we ſee in the *Court* of *England*, there is a Service which they call *All-night*; which is (as it were) a great Cake of wax, with the Wieke in the Middeſt; whereby it commeth to paſſe, that the Wieke fetcheth the Nouriſhment further off. We ſee alſo that *Lamps* laſt longer, becauſe the veſſell is farre broader, than the Bredth of a Taper, or Candle. 372

Take a *Turreted Lampe* of *Tinne*, made in the forme of a Squire; The Heighth of the *Turret* being thrice as much, as the length of the lower part, whereupon the *Lampe* ſtandeth: Make only one Hole in it, at the End of the Returne furtheſt from the *Turret*. Reverſe it, and fill it full of *Oile*, by that Hole; And then ſet it upright againe; And put a Wieke in at the Hole; And lighten it: You ſhall finde, that it will burne ſlow, and a long time. Which is cauſed, (as was ſaid laſt before,) for that the *Flame* fetcheth the *Nouriſhment a farre off*. You ſhall finde alſo, that as the *Oile* waſteth, and deſcendeth, ſo the Top of the *Turret*, by little and little, filleth with Aire; which is cauſed by the Rarefaction of the oile by the Heat. It were worthy the Obſervation, to make a Hole, in the Top of the *Turret*, and to trie, when the *Oile* is almoſt conſumed, whether the *Aire* made of the *Oile*, if you put to it a *Flame* of a *Candle*, in the letting of it forth, will Enflame. It were good alſo to have the *Lampe* made, not of *Tinne*, but of *Glaſſe*, that you may ſee how the Vapour, or Aire gathereth, by degrees, in the Top. 373

A fourth Point, that importeth the *laſting* of the *Flame*, is the *Cloſeneſſe* of the *Aire*, wherein the *Flame* burneth. Wee ſee, that if *Wind* bloweth upon a *Candle*, it waſteth apace. We ſee alſo, it laſteth longer in a *Lanthorne*, than at *large*. And there are Traditions of *Lamps*, and *Candles*, that have burnt a very long time, in *Caves*, and *Tombes*. 374

A Fifth Point, that importeth the *Laſting* of the *Flame*, is the *Nature* of the *Aire*, where the *Flame* burneth; whether it be Hot or Cold; Moiſt or Drie. The *Aire*, if it be very *Cold*, irritateth the *Flame*, and maketh it burne more fiercely; (As Fire ſcorcheth in Froſtie weather;) And ſo furthereth the *Conſumption*. The *Aire* once heated, (I conceive) maketh the *Flame* burne more mildly, and ſo helpeth the *Continuance*. The *Aire*, if it be *Drie*, is indifferent: The *Aire*, if it be *Moiſt*, doth in a Degree quench the *Flame*: (As wee ſee *Lights* will go out in the *Damps* of *Mines*:) And howſoever maketh it burne more dully: And ſo helpeth the *Continuance*. 375

Experiments in Conſort, touching *Burialls* or *Infuſions* of diuers *Bodies* in *Earth*.

Burialls in *Earth* ſerue for *Preſervation*; And for *Condenſation*; And for *Induration* of *Bodies*. And if you intend *Condenſation*, or *Induration*, you may 376

may bury the *Bodies* so, as *Earth* may touch them: As if you will make *Artificiall Porcellane*, &c. And the like you may do for *Conservation*, if the *Bodies* be Hard, and Solid; As Clay, Wood, &c. But if you intend *Preservation* of *Bodies*, more Soft and Tender, then you must doe one of these two: Either you must put them in *Cases*, whereby they may not touch the *Earth*; Or else you must *vault* the *Earth*, whereby it may hang over them, and not touch them; For if the *Earth* touch them, it will doe more hurt, by the Moisture, causing them to putrifie, than good by the virtuall Cold, to conserve them; Except the *Earth* be very Drie, and Sandie.

377 An *Orenge*, *Limon*, and *Apple*, wrapt in a Linnen Cloth, being buried for a Fortnights Space, foure Foot deepe within the Earth, though it were in a Moist Place, and a Rainie Time, yet came forth, no wayes mouldie, or Rotten, but were become a little harder than they were; Otherwise fresh in their Colour; But their Juyce somewhat flatted. But with the *Buriall* of a Fortnight more they became Putrified.

378 A *Bottle* of *Beere*, *buried* in like manner, as before, became more lively, better tasted, and Clearer, than it was. And a *Bottle* of *Wine* in like manner. A *Bottle* of *Vinegar*, so buried, came forth more lively, and more Odoriferous, smelling almost like a Violet. And after the whole Moneths *Buriall*, all the Three came forth, as fresh and lively, if not better, than before.

379 It were a profitable *Experiment*, to preserve *Orenges*, *Limons*, and *Pomgranates*, till Summer; For then their Price will be mightily increased. This may be done, if you put them in a Pot or Vessell, well covered, that the *Moisture* of the *Earth* come not at them; Or else by putting them in a *Conservatory* of *Snow*. And generally, whosoever will make *Experiments* of *Cold*, let him be provided of three Things; A *Conservatory* of *Snow*; A good *large Vault*, twenty foot at least under the Ground; And a *Deepe Well*.

380 There hath beene a Tradition, that *Pearle*, and *Corall*, and *Turchois-Stone*, that have lost their Colours, may be recovered by *Burying* in the *Earth*: Which is a thing of great profit, if it would sort: But upon Triall of Sixe Weekes *Buriall*, there followed no Effect. It were good to trie it, in a *Deep Well*; Or in a *Conservatory* of *Snow*, where the Cold may be more Constringent; And so make the *Body* more united, and thereby more Resplendent.

Experiment Solitary touching the *Affects in Mens Bodies* from *Severall Winds*.

381 *Mens Bodies* are heavier, and lesse disposed to Motion, when *Southern Winds* blow, than when *Northerne*. The *Cause* is, for that when the *Southerne Winds* blow, the Humours doe (in some Degree) melt, and waxe fluide, and so flow into the Parts; As it is seen in *Wood*, and other *Bodies*; which, when the *Southerne Winds* blow, doe swell. Besides, the Motion and Activity of the Body consisteth chiefly in the Sinewes, which, when the *Southerne Wind* bloweth, are more relax.

Experiment Solitary touching *Winter* and *Summer Sicknesses*.

382 It is commonly seen, that more are *Sick* in the *Summer*, and more *Dye* in the *Winter*; Except it be in *Pestilent Diseases*, which commonly raigne in *Summer*, or *Autumne*. The Reason is, because *Diseases* are bred (indeed) chiefly by *Heat*; But then they are Cured most by *Sweat*, and *Purge*; which in the *Summer* commeth on, or is provoked, more Easily: As for *Pestilent Diseases*, the Reason why most Dye of them in *Summer*, is because they are bred most in the *Summer*; For otherwise those that are touched are in most danger in the *Winter*.

The

THe Generall Opinion is, that *Yeares Hot* and *Moist*, are most *Pestilent*; Upon the Superficiall Ground, that *Heat* and *Moisture* cause *Putrefaction*. In *England* it is found not true; For, many times, there have beene great *Plagues* in *Drie Yeares*. Whereof the Cause may be, for that *Drought* in the Bodies of *Islanders*, habituate to *Moist Aires*, doth Exasperate the Humours, and maketh them more apt to Putrifie, or Enflame: Besides, it tainteth the *Waters* (commonly,) and maketh them lesse wholesome. And againe in *Barbary*, the *Plagues* breake up in the *Summer-moneths*, when the *Weather* is *Hot* and *Dry*.

Experiment Solitary touching *Pestilentiall Seasons*. 383

MAny *Diseases*, (both *Epidemicall*, and others,) breake forth at *Particular times*. And the *Cause* is falsly imputed to the *Constitution* of the *Aire*, at *that time*, when they *breake forth*, or *raigne*; whereas it proceedeth (indeed) from a *Precedent Sequence*, and *Series* of the *Seasons* of the *Yeare*: And therefore *Hippocrates*, in his *Prognosticks*, doth make good Observations, of the *Diseases*, that ensue upon the *Nature*, of the *Precedent foure Seasons* of the *Yeare*.

Experiment Solitary touching an *Errour received* about *Epidemicall Diseases*. 384

TRiall hath beene made, with *Earthen Bottles* well stopped, hanged in a *Well* of Twenty Fathome deepe, at the least; And some of the *Bottles* have beene let downe into the *Water*, some others have hanged above, within about a fathome of the *Water*; And the *Liquours* so tried have beene, *Beere*, (not New, but Ready for drinking,) and *Wine*, and *Milke*. The Proofe hath beene, that both the *Beere*, and the *Wine*, (as well within *Water*, as above,) have not beene palled or deaded at all; But as good, or somewhat better, than *Bottles* of the same *Drinkes*, and Staleness, kept in a *Celler*. But those which did hang above *Water*, were apparently the best; And that *Beere* did flower a little; whereas that under *Water* did not, though it were Fresh. The *Milke* sowered, and began to Putrifie. Nevertheless it is true, that there is a *Village* neare *Blois*, where in *Deepe Caves* they doe thicken *Milke*; In such sort, that it becommeth very pleasant; Which was some *Cause* of this Triall of Hanging *Milke* in the *Well*: But our proofe was naught; Neither doe I know, whether that *Milke* in those *Caves*, bee first boyled. It were good therefore to trie it with *Milke* Sodden, and with Creame; For that *Milke* of it selfe is such a Compound Body, of *Creame*, *Curds*, and *Whey*, as it is easily Turned, and Dissolved. It were good also to trie the *Beere*, when it is in *Wort*, that it may bee seene, whether the *Hanging* in the *Well*, will Accelerate the *Ripening* and *Clarifying* of it.

Experiment Solitary touching the *Alteration* or *Preservation* of *Liquours* in *Wells*, or *deepe Vaults*. 385

DIvers, we see, doe *Stut*. The *Cause* may bee, (in most,) the *Refrigeration* of the *Tongue*; Whereby it is lesse apt to move. And therefore wee see, that *Naturalls* doe generally *Stut*: And wee see that in those that *Stut*, if they drinke Wine moderately, they *Stut* lesse, because it heateth: And so we see, that they that *Stut*, doe *Stut* more in the first offer to speake, than in Continuance; Because the *Tongue* is, by Motion, somewhat heated. In some also, it may be, (though rarely,) the *Drinesse* of the *Tongue*; which likewise maketh it lesse apt to move, as well as *Cold*; For it is an Affect that it cometh to some *Wise* and *Great Men*; As it did unto *Moses*, who was *Linguæ Præpeditæ*; And many *Stutters* (wee finde) are very *Cholericke Men*; *Choler* Enducing a *Drinesse* in the *Tongue*.

Experiment Solitary, touching *Stutting* 386

Experiments in Consort touching *Smels*.

387 *Smells*, and other *Odours*, are Sweeter in the Aire, at some Distance, than neare the Nose; As hath beene partly touched heretofore. The *Cause* is double: First the finer Mixture, or Incorporation of the *Smell*: For wee see that in *Sounds* likewise, they are Sweetest, when we cannot heare every Part by it selfe. The other *Reason* is, for that all *Sweet Smells* have joyned with them, some *Earthy* or *Crude Odours*; And at some distance the *Sweet*, which is the more Spirituall, is perceived; And the *Earthy* reacheth not so farre.

388 *Sweet Smells* are most forcible, in *Drie Substances*, when they are *Broken*; And so likewise in *Orenges*, or *Limons*, the Nipping of their Rinde, giveth out their *Smell* more: And generally, when *Bodies* are *Moved* or *Stirred*, though not *Broken*, they *Smell* more; As a Sweet-Bagge waved. The *Cause* is double: The one, for that there is a *Greater Emission* of the *Spirit*, when Way is made: And this holdeth in the *Breaking*, *Nipping*, or *Crushing*; It holdeth also, (in some degree) in the Moving: But in this last, there is a Concurrence of the Second *Cause*; Which is the *Impulsion* of the *Aire*, that bringeth the *Sent* faster upon us.

389 The daintiest *Smells* of *Flowers*, are out of those *Plants*, whose *Leaves smell* not; As *Violets*, *Roses*, *Wall-flowers*, *Gilly-flowers*, *Pincks*, *Wood-bines*, *Vine-flowers*, *Apple-Bloomes*, *Lime-Tree Bloomes*, *Beane-Bloomes*, &c. The *Cause* is, for that where there is Heat and strength enough in the *Plant*, to make the *Leaves Odorate*, there the *Smell* of the *Flower* is rather Evanide and Weaker, than that of the *Leaves*; As it is in *Rose-Mary-Flowers*, *Lavender-Flowers*, and *Sweet-Briar-Roses*. But where there is lesse Heat, there the *Spirit* of the *Plant*, is disgested and refined, and severed from the Grosser Juyce, in the *Efflorescence*, and not before.

390 Most *Odours* smell best, *Broken* or *Crusht*, as hath beene said; But *Flowers Pressed* or *Beaten*, doe leese the Freshnesse and Sweetnesse of their *Odour*. The *Cause* is, for that when they are *Crushed*, the Grosser and more *Earthy Spirit* commeth out with the Finer, and troubleth it; Whereas in stronger *Odours* there are no such Degrees of the Issue of the *Smell*.

Experiments in Consort, touching the *Goodnesse* and *Choyce* of *Water*.

391 IT is a Thing of very good Use, to Discover the *Goodnesse* of *Waters*. The *Taste*, to those that Drinke *Water* onely, doth somewhat: But other *Experiments* are more sure. First, try *Waters* by *Weight*; Wherein you may finde some difference, though not much: And the *Lighter* you may account the Better.

392 Secondly, try them by *Boyling* upon an *Equall Fire*: And that which consumeth away fastest, you may account the Best.

393 Thirdly, try them in *Severall Bottles*, or Open Vessels, Matches in every Thing else, and see which of them *Last Longest*, without *Stench*, or *Corruption*. And that which holdeth Unputrified longest, you may likewise account the Best.

394 Fourthly, try them by *Making Drinkes* Stronger, or Smaller, with the same *Quantity* of *Mault*; And you may conclude, that that *Water*, which maketh the *Stronger Drinke*, is the more Concocted, and Nourishing; though perhaps it be not so good for *Medicinall use*. And such *Water* (commonly) is the *Water* of *Large* and *Navigable Rivers*: And likewise in *Large* and *Cleane Ponds* of *Standing Water*: For upon both them, the Sunne hath more power than upon Fountaines, or Small Rivers. And I conceive that *Chalke-Water* is next them the best, for going furthest in *Drinke*: For that also helpeth *Concoction*; So it be out of a *Deepe Well*; For then it Cureth the

the Rawneſſe of the *Water*; But *Chalkie Water*, towards the Top of the Earth, is too fretting; As it appeareth in Laundry of Cloaths, which weare out apace, if you uſe ſuch *Waters*.

Fifthly, the Houſwives doe finde a Difference in *Waters*, for the *Bearing* or *Not Bearing* of *Soape*: And it is likely that the more *Fat Water* will beare *Soape* beſt; For the *Hungry water* doth kill the Unctuous Nature of the *Soape*. 395

Sixthly, you may make a Judgement of *Waters*, according to the *Place*, whence they Spring, or Come: The *Raine-Water* is, by the *Phyſitians* eſteemed the Fineſt, and the beſt; But yet it is ſaid to putrifie ſooneſt; which is likely, becauſe of the Fineneſſe of the Spirit: And in *Conſervatories* of *Raine-water*, (ſuch as they have in *Venice*, &c.) they are found not ſo Choice *Waters*; The worſe, (perhaps,) becauſe they are Covered aloft, and kept from the Sunne. *Snow-water* is held unwholeſome; In ſo much as the People, that dwell at the Foot of the *Snow-Mountaines*, or otherwiſe upon the Aſcent, (eſpecially the Women,) by drinking of *Snow-water*, have great Bagges hanging under their Throats. *Well-water*, except it be upon *Chalke*, or a very plentifull Spring, maketh Meat Red; which is an ill Signe. *Springs* on the *Tops* of *High-Hills* are the beſt: For both they ſeeme to have a Lightneſſe, and Appetite of Mounting; And beſides they are moſt pure and unmingled; And againe, are more Percolated thorow a great ſpace of Earth. For *Waters* in *Valleyes*, joyne in effect under Ground with all *Waters* of the ſame Levell; Whereas *Springs* on the *Tops* of *Hills*, paſſe thorow a great deale of Pure *Earth*, with leſſe Mixture of other *Waters*. 396

Seventhly, Judgement may bee made of *Waters* by the *Soyle whereupon the Water runneth*; As *Pebble* is the Cleaneſt, and beſt taſted; And next to that *Clay-water*; And Thirdly, *Water* upon *Chalke*; Fourthly, that upon *Sand*; And Worſt of all upon *Mudde*. Neither may you truſt *Waters* that *Taſte Sweet*; For they are commonly found in Riſing Grounds of great *Cities*; which muſt needs take in a great deale of Filth. 397

Experiment Solitary touching the *Temperate Heat* under the *Æquinoctiall*.

IN *Peru*, and divers Parts of the *Weſt-Indies*, though under the *Line*, the *Heats* are not ſo Intolerable, as they be in *Barbary*, and the Skirts of the *Torrid Zone*. The *Cauſes* are, Firſt, the Great *Brizes*, which the Motion of the Aire in great Circles, (ſuch as are under the *Girdle* of the *World*,) produceth; Which doe refrigerate; And therefore in thoſe Parts Noone is nothing ſo hot, when the *Brizes* are great, as about Nine or Ten of the Clocke in the Fore-Noone. Another *Cauſe* is, for that the Length of the Night; and the Dewes thereof, doe compenſe the *Heat* of the Day. A third *Cauſe* is the Stay of the Sunne; Not in Reſpect of Day and Night, (for that wee ſpake of before,) but in Reſpect of the Seaſon; For under the *Line*, the Sunne croſſeth the *Line*, and maketh two Summers, aud two Winters; But in the Skirts of the *Torrid Zone*, it doubleth, and goeth back againe, and ſo maketh one Long Summer. 398

Experiment Solitary touching the *Coloration* of *Blacke* and *Tawney Moores*.

THe *Heat* of the *Sunne* maketh *Men Blacke* in ſome Countries, as in *Æthiopia*, and *Ginny*, &c. *Fire* doth it not, as wee ſee in *Glaſſe-Men*, that are continually about the *Fire*. The *Reaſon* may bee, becauſe *Fire* doth lick up the *Spirits*, and Bloud of the Body, ſo as they Exhale; So that it ever maketh *Men* looke Pale and Sallow; But the *Sunne*, which is a Gentler Heat, doth but draw the Bloud to the Outward *Parts*; And rather Concocteth it, than Soaketh it: And therefore wee ſee that all 399

Æthiopes are Fleshy, and Plumpe, and have great Lips; All which betoken *Moisture* retained, and not drawne out. We see also, that the *Negroes* are bred in Countries that have plenty of *Water*, by *Rivers*, or otherwise: For *Meroë*, which was the *Metropolis* of *Æthiopia*, was upon a great Lake: And *Congo*, where the *Negroes* are, is full of Rivers. And the Confines of the River *Niger*, where the *Negroes* also are, are well watered: And the Region about *Capo Verde*, is likewise Moist, in so much as it is pestilent through Moisture: But the Countries of the *Abyssenes*, and *Barbary*, and *Peru*, where they are Tawney, and Olivaster, and Pale, are generally more Sandy, and Dry. As for the *Æthiopes*, as they are Plumpe, and Fleshy; So (it may be) they are Sanguine, and ruddy Coloured, if their black Skinne would suffer it to be seene.

Experiment Solitary touching *Motion* after the *Instant* of *Death*.

400

SOme *Creatures* doe move a good while after their Head is off; As *Birds*; Some a very little time; As *Men*, and all beasts; Some move, though cut in severall Pieces; As *Snakes*, *Eeles*, *Wormes*, *Flies*, &c. First therefore it is certaine, that the *Immediate Cause* of *Death*, is the Resolution or Extinguishment of the *Spirits*; And that the Destruction or Corruption of the *Organs*, is but the *Mediate Cause*. But some *Organs* are so peremptorily necessary, that the Extinguishment of the Spirits doth speedily follow; But yet so, as there is an *Interim* of a Small Time. It is reported by one of the *Ancients*, of credit, that a *Sacrificed Beast* hath lowed, after the Heart hath beene severed; And it is a Report also of Credit, that the *Head* of a *Pigge* hath beene opened, and the Braine put into the Palme of a Mans hand, trembling, without breaking any part of it, or severing it from the Marrow of the Back-bone; During which time the *Pigge* hath beene, in all appearance, starke dead, and without Motion; And after a small Time the Braine hath beene replaced, and the Skull of the *Pigge* closed, and the *Pigge* hath a little after gone about. And certaine it is, that an *Eye* upon *Revenge* hath been thrust forth, so as it hanged a pretty distance by the *Visuall Nerve*; And during that time the *Eye* hath beene without any Power of *Sight*; And yet after (being replaced) recovered *Sight*. Now the *Spirits* are chiefly in the *Head*, and *Cells* of the *Braine*, which in *Men*, and *Beasts* are Large; And therefore, when the *Head* is off, they move little or nothing. But *Birds* have small *Heads*, and therefore the *Spirits* are a little more dispersed in the *Sinewes*, whereby Motion remaineth in them a little longer; In so much as it is Extant in Story, that an *Emperour* of *Rome*, to shew the Certainty of his Hand, did Shoot a great Forked Arrow at an *Estrich*, as she ran swiftly upon the Stage, and strook off her Head; And yet she continued the Race, a little way, with the Head off. As for *Wormes*, and *Flies*, and *Eeles*, the *Spirits* are diffused almost all over; And therefore they move in their Severall Pieces.

NATU-

NATVRALL HISTORIE.

V. Century.

WEE will now enquire of *Plants* or *Vegetables*: And wee ſhall doe it with diligence. They are the principall Part of the *Third Dayes Worke*. They are the firſt *Producat*, which is the Word of *Animation*: For the other Words are but the Words of *Eſſence*; And they are of excellent and generall Uſe, for Food, Medicine, and a Number of Mechanicall Arts.

Experiment in Conſort, touching the *Acceleration* of *Germination*.

There were ſowen in a *Bed*, *Turnip-Seed*, *Radiſh-Seed*, *Wheat*, *Cucumber-Seed*, and *Peaſe*. The *Bed* wee call a *Hot-Bed*, and the Manner of it is this. There was taken *Horſe-dung*, old, and well rotted; This was laid upon a Banke, halfe a foot high, and ſupported round about with Planks; And upon the Top was caſt Sifted Earth, ſome two Fingers deepe; And then the *Seed* ſprinkled upon it, having been ſteeped all night in *Water* Mixed with *Cow-dung*. The *Turnip-Seed*, and the *Wheat* came up halfe an Inch above Ground, within two dayes after, without any Watring. The Reſt the third day. The *Experiment* was made in *October*; And (it may be) in the *Spring*, the *Accelerating* would have been the ſpeedier. This is a Noble *Experiment*; For without this helpe, they would have beene foure times as long in comming up. But there doth not occurre to me, at this preſent, any uſe thereof, for profit; Except it ſhould be for Sowing of *Peaſe*, which have their price very much increaſed, by the early Comming. It may be tried alſo with *Cherries*, *Strawberries*, and other Fruit, which are dearest, when they come early. 401

There was *Wheat*, ſteeped in *Water* mixed with *Cow-dung*; Other in *Water* mixed with *Horſe-Dung*; Other in *Water* mixed with *Pigeon-Dung*; Other in *Vrine* of *Man*; Other in *Water* mixed with *Chalke* powdred; Other in *Water* mixed with *Soot*; Other in *Water* mixed with *Aſhes*; Other in *Water* 402

ter mixed with *Bay-Salt*; Other in *Claret Wine*; Other in *Malmsey*; Other in *Spirit* of *Wine*. The Proportion of the Mixture was, a fourth Part of the Ingredients to the *Water*; Save that there was not of the *Salt* above an eighth Part. The *Vrine*, and *Wines*, and *Spirit* of *Wine*, were Simple without Mixture of *Water*. The Time of the Steeping was twelve houres. The Time of the Yeare *October*. There was also other *Wheat* sowen *unsteeped*, but *watred* twice a day with *Warmewater*. There was also other *Wheat* sowen *Simple* to compare it with the rest. The Event was; that those that were in the Mixture of *Dung*, and *Vrine*, and *Soot*, *Chalke*, *Ashes*, and *Salt*, came up within sixe dayes: And those that afterwards proved the Highest, Thickest, and most Lustie, were; first the *Vrine*, And then the *Dungs*; Next the *Chalke*; Next the *Soot*; Next the *Ashes*; Next the *Salt*; Next the *Wheat Simple* of it selfe, unsteeped, and unwatered; Next the *Watered twice a day* with warme water; Next the *Claret Wine*. So that these three last were slower than the Ordinary *Wheat* of it selfe; And this Culture did rather retard, than advance. As for those that were steeped in *Malmsey*, and *Spirit* of *Wine*, they came not up at all. This is a Rich *Experiment* for Profit; For the most of the Steepings are Cheape Things; And the goodnesse of the Crop is a great Matter of Gaine; If the Goodnesse of the Crop answer the Earlinesse of the Comming up: As it is like it will; Both being from the Vigour of the *Seed*; Which also partly appeared in the Former *Experiments*, as hath beene said. This *Experiment* would be tried in other *Grains*, *Seeds*, and *Kernells*: For it may be some *Steeping* will agree best with some *Seeds*. It would be tried also with *Roots* steeped as before, but for *longer time*. It would be tried also, in *Severall Seasons* of the *Yeare*, especially the *Spring*.

403 *Strawberries* watered now and then, (as once in three dayes,) with *Water*, wherein hath beene steeped *Sheepes-dung*, or *Pigeons-dung*, will prevent and come early. And it is like the same Effect would follow in other *Berries*, *Herbs*, *Flowers*, *Graines*, or *Trees*. And therefore it is an *Experiment*, though vulgar in *Strawberries*, yet not brought into use generally: For it is usuall to helpe the Ground with Mucke; And likewise to Recomfort it sometimes with Muck put to the Roots; But to water it with *Muck water*, which is like to be more Forcible, is not practised.

404 *Dung*, or *Chalke*, or *Bloud*, applied in Substance, (seasonably,) to the Roots of Trees, doth set them forwards. But to doe it unto *Herbs*, without Mixture of *Water* or *Earth*, it may be these helps are too Hot.

405 The former *Meanes* of Helping *Germination*, are either by the *Goodnesse* and *Strength* of the *Nourishment*; Or by the *Comforting*, and *Exciting* the *Spirits* in the *Plant*, to draw the Nourishment better. And of this latter kinde, concerning the *Comforting* of the *Spirits* of the *Plant*, are also the experiments that follow; Though they be not Applications to the *Root*, or *Seed*. The *Planting* of *Trees warme* upon a *Wall*, against the South, or South-East Sunne, doth hasten their Comming on, and Ripening; And the South-East is found to be better than the South-West, though the South-West bee the Hotter Coast. But the cause is chiefly, for that the Heat of the Morning succeedeth the Cold of the Night: and partly, because, (many times) the South-West Sunne is too Parching. So likewise the *Planting* of them upon the *Back* of a *Chimney* where a *Fire* is kept, doth hasten their Comming on, and Ripening: Nay more, the *Drawing* of the *Boughes* into the *Inside* of a *Roome*, where a Fire is continually kept, worketh the same Effect; which hath beene tried with Grapes; In so much as they will come a Moneth earlier, than the Grapes abroad.

Besides

Besides the two *Meanes* of *Accelerating Germination*, formerly described; That is to say, the *Mending* of the *Nourishment*; *Comforting* of the *Spirit* of the *Plant*; there is a Third; Which is the *Making Way* for the *Easie Comming* to the *Nourishment*, and *Drawing* it. And therefore *Gentle Digging* and *Loosening* of the *Earth* about the *Roots* of *Trees*; And the *Removing Herbes* and *Flowers* into new Earth, once in two yeares, (which is the same thing; For the new Earth is ever looser,) doth greatly further the *Prospering*, and *Earlinesse* of *Plants*. 406

But the most admirable *Acceleration* by *Facilitating* the *Nourishment*, is that of *Water*. For a *Standard* of a *Damaske* Rose with the *Root* on, was set in a Chamber, where no Fire was, upright in an *Earthen Pan*, full of *Faire Water*, without any Mixture, halfe a foot under the *Water*, the *Standard* being more than two Foot high above the *Water*: Within the Space of ten dayes, the *Standard* did put forth a faire Greene leafe, and some other little Buds, which stood at a stay, without any Shew of decay or withering, more than seven Dayes. But afterwards that Leafe faded, but the young Buds did sprout on; which afterward opened into fair Leaves, in the space of three Moneths; And continued so a while after, till upon Removall we left the Triall. But note that the *Leaves* were somewhat paler, & lighter-colored, than the *Leaves* use to be abroad. Note that the first *Buds* were in the End of *October*; And it is likely that if it had beene in the *Spring* time, it would have put forth with greater strength, and (it may be) to have growne on to beare Flowers. By this Meanes, you may have, (as it seemeth,) *Roses* set in the middest of a *Poole*, being supported with some stay; Which is Matter of Rarenesse and Pleasure, though of small Use. This is the more strange, for that the like *Rose-standard* was put, at the same time, into *Water* mixed with *Horse-dung*, the Horse-dung about the fourth Part to the *Water*, and in foure Moneths space (while it was observed) put not forth any *Leafe*, though divers *Buds* at the first, as the other. 407

A *Dutch Flower*, that had a *Bulbous Root*, was likewise put, at the same time, all under *Water*, some two or three Fingers deep; And within seven dayes sprouted, and continued long after, further Growing. There were also put in, a *Beet-Root*, a *Borrage-Root*, and a *Raddish-Root*, which had all their *Leaves* cut almost close to the *Roots*; And within six weekes had faire *Leaves*; And so continued, till the end of *November*. 408

Note that if *Roots*, or *Pease*, or *Flowers*, may be *Accelerated* in their *Comming* and *Ripening*, there is a double Profit; The one in the high *Price* that those Things beare when they come early: The other in the *Swiftnesse* of their *Returnes*: For in some Grounds which are strong, you shall have a *Raddish*, &c. come in a Moneth; That in other Grounds will not come in two; And so make double *Returnes*. 409

Wheat also was put into the *Water*, and came not forth at all; So as it seemeth there must be some Strength and Bulke in the Body, put into the *Water*, as it is in *Roots*; For *Graines*, or *Seeds*, the Cold of the *Water* will mortifie. But casually some *Wheat* lay under the Pan, which was somewhat moistened by the Suing of the Pan; which in six weekes (as aforesaid) looked mouldy to the Eye, but it was sprouted forth halfe a Fingers length. 410

It seemeth by these *Instances* of *Water*, that for Nourishment, the *Water* is almost all in all, and that the *Earth* doth but keepe the *Plant* upright, and save it from Over-heat, and Over-cold; And therefore is a Comfortable *Experiment* for good *Drinkers*. It proveth also that our former *Opinion*; That 411

Drinke

Drinke incorporate with Flesh, or Roots, (as in *Capon-Beere*, &c.) will nourish more easily, than Meat and Drinke taken severally.

412 The *Housing* of *Plants* (I conceive) will both *Accelerate Germination*, and bring forth *Flowers* and *Plants* in the *Colder Seasons:* And as we *House Hot Countrey Plants*, as *Limons*, *Orenges*, *Myrtles*, to save them; So we may *House* our own *Countrey Plants*, to forward them, and make them come in the Cold Seasons; In such sort, that you may have *Violets*, *Strawberries*, *Pease*, all Winter: So that you sow, or remove them at fit times. This *Experiment* is to be referred unto the *Comforting* of the *Spirit* of the *Plant*, by *Warmth*, as well as *Housing* their *Boughs*, &c. So then the *Meanes*, to *Accelerate Germination*, are in Particular eight, in Generall three.

Experiments in Consort, touching the *Putting backe* or *Retardation* of *Germination*.

TO make *Roses*, or other *Flowers* come late, it is an *Experiment* of Pleasure. For the Ancients esteemed much of *Rosa Sera*. And indeed the *November-Rose* is the sweetest, having been lesse exhaled by the Sunne. The Meanes are these. First, the *Cutting off their Tops*, immediately after they

413 have done Bearing; And then they will come againe the same yeare about *November:* But they will not come just on the Tops, where they were cut, but out of those Shoots, which were (as it were,) *Water-Boughs*. The *Cause* is, for that the Sap, which otherwise would have fed the Top, (though after Bearing,) will, by the discharge of that, divert unto the Side-Sprouts; And they will come to beare, but later.

414 The Second is the *Pulling off the Buds of the Rose*, when they are *Newly knotted*; For then the Side-Branches will beare. The *Cause* is the same with the former: For *Cutting off the Tops*, and *Pulling off the Buds* worke the same Effect, in Retention of the Sap for a time, and Diversion of it to the Sprouts, that were not so forward.

415 The Third is the *Cutting* off some few of the *Top-Boughes* in the *Springtime*, but suffering the lower Boughes to grow on. The *Cause* is, for that the Boughes doe helpe to draw up the Sap more strongly; And we see that in Powling of Trees, many doe use to leave a Bough or two on the Top, to helpe to draw up the Sap. And it is reported also, that if you graft upon the Bough of a Tree, and cut off some of the old Boughes, the new Cions will perish.

416 The Fourth is by *Laying the Roots bare about Christmas*, some dayes. The *Cause* is plaine, for that it doth arrest the Sap, from going upwards, for a time; Which Arrest is afterwards released by the Covering of the Root againe with Earth; And then the Sap getteth up, but later.

417 The Fifth is the *Removing* of the *Tree*, some Moneth before it *Buddeth*. The *Cause* is, for that some time will be required after the *Remove*, for the Resetling, before it can draw the Juyce; And that time being lost, the Blossome must needs come forth later.

418 The Sixth is the *Grafting* of *Roses* in *May*, which commonly Gardiners doe not till *Iuly*; And then they beare not till the Next Yeare; But if you graft them in *May*, they will beare the same yeare, but late.

419 The Seventh is, the *Girding* of the *Body* of the *Tree* about with some Packthreed; For that also in a degree, restraineth the Sap, and maketh it come up more late, and more Slowly.

420 The Eighth is, the *Planting* of them in a *Shade*, or in a *Hedge*; The *Cause* is, partly the Keeping out of the Sunne, which hasteneth the Sap to rise; And partly the Robbing of them of Nourishment, by the Stuffe in the *Hedge*. These meanes may be practised upon other, both Trees, and Flowers, *Mutatis Mutandis*.

Men

Men have entertained a Conceit that sheweth prettily; Namely, that if you graft a *Late-Comming Fruit*, upon a Stocke of a *Fruit-Tree* that *Commeth early*, the Graft will beare *Fruit Early*; As a Peach upon a Cherry; And contrariwise, if an *Early-Comming-Fruit* upon a Stock of a *Fruit-Tree* that *Commeth late*, the Graft will beare Fruit late; As a Cherry upon a Peach. But these are but Imaginations, and untrue. The *Cause* is, for that the Cions overruleth the Stock quite; And the Stock is but Passive onely, and giveth Aliment, but no Motion to the Graft. 421

Wee will speake now, how to make *Fruits*, *Flowers*, and *Roots* larger; in more plenty; and sweeter; than they use to be; And how to make the *Trees* themselves, more Tall; more Spread; and more Hasty and Sudden; than they use to bee. Wherein there is no doubt, but the former *Experiments* of *Acceleration*, will serve much to these Purposes. And again, that these *Experiments*, which we shall now set downe, doe serve also for *Acceleration*; because both Effects proceed from the Encrease of vigour in the Tree; But yet to avoid Confusion; And because some of the Means are more proper for the one Effect, and some for the other, we will handle them apart. Experiments in Consort, touching the *Melioration* of *Fruits*, *Trees*, and *Plants*.

It is an assured Experience, that an *Heape* of *Flint*, or *Stone*, laid about the *Bottome* of a *Wilde-Tree*, (as an Oake, Elme, Ash, &c.) upon the first Planting, doth make it prosper double as much, as without it. The *Cause* is, for that it retaineth the Moisture, which falleth at any time upon the *Tree*, and suffereth it not to be exhaled by the Sunne. Againe, it keepeth the Tree warme, from Cold Blasts and Frosts, as it were in an House. It may be also, there is somewhat in the Keeping of it steady at the first. *Quære*, if Laying of Straw some Height about the Body of a *Tree*, will not make the *Tree* forwards. For though the Root giveth the Sap, yet it is the Body that draweth it. But you must note, that if you lay *Stones* about the stalke of Lettuce, or other Plants, that are more soft, it will over-Moisten the Roots, so as the Wormes will eate them. 422

A *Tree*, at the first *Setting*, should not be *Shaken*, untill it hath *taken Root fully*: And therefore some have put two little Forkes about the Bottome of their *Trees*, to keep them upright; But after a yeares Rooting, then Shaking doth the *Tree* good, by Loosening of the Earth, and (perhaps) by Exercising (as it were) and Stirring the Sap of the *Tree*. 423

Generally, the *Cutting away* of *Boughes* and *Suckers* at the *Root* and *Body*, doth make *Trees* grow high; And contrariwise, the *Powling* and *Cutting* of the Top, maketh them grow spread, and bushy. As we see in *Pollards*, &c. 424

It is reported, that to make *hasty Growing Coppice-Woods*, the way is, to take *Willow*, *Sallow*, *Poplar*, *Alder*, of some seven yeares growth; And to set them, not upright, but a-slope, a reasonable depth under the Ground; And then, in stead of one Root, they will put forth many, and so carry more Shoots upon a Stemme. 425

When you would have *many new Roots* of *Fruit-Trees*, take a *Low Tree*, and bow it, and lay all his branches a-flat upon the Ground, and cast Earth upon them; And every Twigge will take Root. And this is a very profitable 426

ble *Experiment* for Costly *Trees*; (for the Boughes will make Stockes without charge;) Such as are *Apricots*, *Peaches*, *Almonds*, *Cornelians*, *Mulberries*, *Figs*, &c. The like is continually practised with *Vines*, *Roses*, *Muske-Roses*, &c.

427 From *May* to *Iuly* you may take off the *Barke* of any *Bough*, being of the Bignesse of three or foure Inches, and cover the bare Place, somewhat above, and below, with Loame well tempered with Horse-dung, binding it fast downe. Then cut off the Bough about *Alhallontide* in the bare Place, and set it in the Ground; And it will grow to be a faire *Tree* in one Yeare. The *Cause* may be, for that the *Baring* from the *Barke* keepeth the *Sap* from descending towards Winter, and so holdeth it in the Bough; And it may bee also that the Loam and Horse-dung applyed to the bare place, doe moisten it, and cherish it, and make it more apt to put forth the Root. Note, that this may be a generall Meanes for keeping up the Sap of *Trees* in their Boughes; Which may serve to other Effects.

428 It hath been practised in *Trees*, that shew faire, and beare not, to *Bore a Hole* thorow the *Heart* of the *Tree*, and thereupon it will beare. Which may be, for that the *Tree* before had two much *Repletion*, and was oppressed with his owne Sap; For *Repletion* is an Enemie to Generation.

429 It hath beene practised in *Trees*, that doe not beare, to cleave two or three of the Chiefe Roots, and to put into the Cleft a small Pebble, which may keepe it open, and then it will beare. The *Cause* may be, for that a Root of a Tree may be (as it were,) Hide-bound, no lesse than the Body of the Tree; but it will not keep open without somewhat put into it.

430 It is usually practised, to set *Trees* that require much *Sunne*, upon *Walls* against the *South*; As *Apricots*, *Peaches*, *Plums*, *Vines*, *Figs*, and the like. It hath a double Commoditie; The one, the *Heat* of the *Wall* by *Reflexion*; The other, the *Taking away* of the *Shade*; For when a *Tree* groweth round, the upper Boughes over-shadow the lower: But when it is spread upon a Wall, the Sunne commeth alike, upon the upper, and lower Branches.

431 It hath also been practised (by some) to pull off some *Leaves* from the *Trees* so *spread*, that the Sunne may come upon the *Bough* and *Fruit* the better. There hath been practised also a Curiositie, to set a *Tree* upon the *North-Side* of a Wall, and at a little height, to draw him thorow the Wall, and spread him upon the *South-Side*: Conceiving that the Root and lower Part of the Stocke should enjoy the Freshnesse of the Shade; And the Upper Boughes, and Fruit, the Comfort of the Sunne. But it sorted not; The *Cause* is, for that the *Root* requireth some Comfort from the Sunne, though under Earth, as well as the *Bodie*: And the Lower Part of the Bodie more than the Upper, as wee see in Compassing a *Tree* below with straw.

432 The *Lownesse* of the *Bough*, where the *Fruit* commeth, maketh the *Fruit* greater, and to ripen better; For you shall ever see in *Apricots*, *Peaches*, or *Melo-Cotones*, upon a wall, the greatest Fruits towards the Bottome. And in *France* the *Grapes* that make the *Wine*, grow upon low Vines, bound to small Stakes. And the raised Vines in Arbours make but Verjuyce. It is true, that in *Italy*, and other *Countries*, where they have hotter Sunne, they raise them upon *Elmes*, and Trees; But I conceive, that if the *French* Manner of Planting low, were brought in use there, their *Wines* would be stronger and sweeter. But it is more chargeable in respect of the Props. It were good to trie whether a *Tree* grafted somewhat neare the Ground, and the lower boughes onely maintained, and the higher continually proined off, would not make a larger *Fruit*.

To

To have *Fruit* in *Greater Plentie*, the way is, to graft, not only upon young *Stocks*, but upon divers *Boughes* of an old *Tree*; for they will beare great Numbers of Fruit; Whereas if you graft but upon one Stocke, the *Tree* can beare but few. 433

The *Digging* yearely about the *Roots* of *Trees*, which is a great meanes, both to the *Acceleration* and *Melioration* of *Fruits*, is practised in nothing but in *Vines*; Which if it were transferred unto other *Trees*, and *Shrubs*, (as *Roses*, &c.) I conceive would advance them likewise. 434

It hath beene knowne, that a *Fruit-Tree* hath beene blown up (almost) by the Roots, and set up againe, and the next yeare bare exceedingly. The *Cause* of this, was nothing but the *Loosening* of the *Earth*, which comforteth any *Tree*, and is fit to be practised, more than it is, in *Fruit-Trees*: For *Trees* cannot be so fitly removed into New Grounds, as *Flowers* and *Herbs* may. 435

To revive an *Old Tree*, the Digging of it about the *Roots*, and Applying new Mould to the Roots, is the Way. We see also that *Draught-Oxen*, put into fresh Pasture, gather new and tender Flesh; And in all Things, better Nourishment than hath been used, doth helpe to renew; Especially, if it be not onely better, but changed, and differing from the former. 436

If an *Herbe* be cut off from the *Roots*, in the beginning of Winter, and then the Earth be trodden and beaten downe hard, with the Foot and Spade, the *Roots* will become of very great Magnitude in Summer. The Reason is, for that the Moisture being forbidden to come up in the Plant, stayeth longer in the Root, and so dilateth it. And *Gardiners* use to tread downe any loose Ground, after they have sowne *Onions*, or *Turnips*, &c. 437

If *Panicum* be laid below, and about the Bottome of a *Root*, it will cause the Root to grow to an Excessive Bignesse. The *Cause* is, for that being it selfe of a Spungy Substance, it draweth the Moisture of the Earth to it, and so feedeth the Root. This is of greatest use for *Onions*, *Turnips*, *Parsnips*, and *Carrets*. 438

The *Shifting* of *Ground* is a Meanes to better the *Tree*, and Fruit; But with this Caution; That all Things doe prosper best, when they are advanced to the better: Your *Nurserie* of *Stocks* ought to be in a more Barren Ground, than the Ground is whereunto you remove them. So all *Graziers* preferre their Cattell from meaner Pastures to better. We see also, that Hardnesse in Youth lengthneth Life, because it leaveth a Cherishing to the better, of the Body, in Age: Nay in Exercises, it is good to begin with the hardest, as Dancing in Thicke Shooes, &c. 439

It hath beene observed, that *Hacking* of *Trees* in their *Barke*, both downeright, and acrosse, so as you make them rather in slices, than in continued Hacks, doth great good to *Trees*; And especially delivereth them from being *Hide-bound*, and killeth their Mosse. 440

Shade to some *Plants* conduceth to make them large, and prosperous, more than *Sun*; As in *Strawberries*, and *Bayes*, &c. Therefore amongst *Strawberries*, sow here and there some *Borrage Seed*; And you shall finde the *Strawberries* under those Leaves farre more large than their Fellowes. And *Bayes* you must plant to the *North*; Or defend them from the *Sunne* by a Hedge-Row; And when you sow the *Berries*, weed not the *Borders*, for the first halfe yeare; For the *Weed* giveth them *Shade*. 441

To increase the *Crops* of *Plants*, there would be considered, not onely the *Increasing* the *Lust* of the *Earth*, or of the *Plant*, but the Saving also of that which is spilt. So they have lately made a Triall, to *Set Wheat*; which nevertheless 442

vertheleſſe hath beene left off, becauſe of the trouble and paines; Yet ſo much is true, that there is much ſaved by the *Setting*, in compariſon of that which is *Sowen*; Both by keeping it from being picked up by Birds; And by Avoiding the Shallow lying of it, whereby much that is ſowen taketh no Root.

443 It is preſcribed by ſome of the *Ancients*, that you take *Small Trees*, upon which *Figs* or other *Fruit* grow, being yet unripe, and cover the *Trees* in the Middle of *Autumne* with dung, untill the Spring; And then take them up in a warme day, and replant them in good Ground; And by that meanes, the former yeares *Tree* will be ripe, as by a new Birth; when other *Trees* of the ſame kinde, doe but bloſſome. But this ſeemeth to have no great Probabilitie.

444 It is reported, that if you take *Nitre*, and mingle it with *Water*, to the thickneſſe of *Honey*, and therewith anoint the *Bud*, after the *Vine* is cut, it will ſprout forth within eight dayes. The *Cauſe* is like to be, (if the *Experiment* be true,) the Opening of the *Bud*, and of the Parts Contiguous, by the Spirit of the *Nitre*; For *Nitre* is (as it were) the Life of *Vegetables*.

445 Take *Seed*, or *Kernells* of *Apples*, *Peares*, *Orenges*; Or a *Peach*, or a *Plum-Stone*, &c. And put them into a *Squill*, (which is like a great *Onion*,) and they will come up much earlier than in the *Earth* it ſelf. This I conceive to be as a Kinde of *Grafting* in the *Root*; For as the Stocke of a Graft yeeldeth better prepared Nouriſhment to the Graft, than the Crude Earth; So the *Squill* doth the like to the *Seed*. And I ſuppoſe the ſame would be done, by *Putting Kernells* into a *Turnip*, or the like; Save that the *Squill* is more Vigorous, and Hot. It may bee tried alſo, with putting *Onion-Seed* into an *Onion-Head*, which thereby (perhaps) will bring forth a larger, and earlier *Onion*.

446 The *Pricking* of a *Fruit* in ſeverall places, when it is almoſt at his Bigneſſe, and before it ripeneth, hath beene practiſed with ſucceſſe, to ripen the Fruit more ſuddenly. We ſee the Example of the *Biting* of *Waſpes*, or *Wormes*, upon *Fruit*, whereby it (manifeſtly) ripeneth the ſooner.

447 It is reported, that *Alga Marina* (*Sea-Weed*) put under the *Roots* of *Coleworts*, and (perhaps) of other *Plants*, will further their Growth. The vertue (no doubt) hath Relation to *Salt*, which is a great Helpe to Fertilitie.

448 It hath beene practiſed, to cut off the Stalkes of *Cucumbers*, immediately after their *Bearing*, cloſe by the Earth; And then to caſt a pretty Quantity of Earth upon the *Plant* that remaineth, and they will bear the next year Fruit, long before the ordinarie time. The *Cauſe* may be, for that the Sap goeth downe the ſooner, and is not ſpent in the Stalke or Leafe, which remaineth after the Fruit. Where note, that the *Dying*, in the winter, of the *Roots* of *Plants*, that are *Annuall*, ſeemeth to be partly cauſed by the Over-Expence of the Sap into Stalke, and Leaves; which being prevented, they will ſuper-annate, if they ſtand warme.

449 The *Pulling off* many of the *Bloſſomes* from a *Fruit-Tree*, doth make the *Fruit* fairer. The *Cauſe* is manifeſt; For that the Sap hath the leſſe to nouriſh. And it is a Common Experience, that if you doe not pull off ſome *Bloſſomes*, the firſt time a *Tree* bloometh, it will bloſſome it ſelfe to death.

450 It were good to trie, what would be the Effect, if all the *Bloſſomes* were pulled from a *Fruit-Tree*; Or the *Acornes*, and *Cheſnut-buds*, &c. from a *Wilde Tree*, for two yeares together. I ſuppoſe that the *Tree* will either put forth, the third yeare, bigger, and more plentifull *Fruit*; Or elſe, the ſame yeares, larger Leaves, becauſe of the Sap ſtored up.

It

451 It hath been generally received, that a *Plant watered* with *Warme Water*, will come up sooner and better, than with Cold Water, or with Showers. But our *Experiment* of *Watering Wheat* with *Warme Water* (as hath beene said) succeeded not; which may be, because the Triall was too late in the Yeare, *viz.* in the End of *October*. For the Cold then comming upon the *Seed*, after it was made more tender by the Warme Water, might checke it.

452 There is no doubt, but that *Grafting* (for the most Part) doth *meliorate* the *Fruit*. The *Cause* is manifest; For that the Nourishment is better prepared in the *Stocke*, than in the *Crude Earth*: But yet note well, that there bee some *Trees*, that are said to come up more happily from the *Kernell*, than from the *Graft*; As the *Peach*, and *Melocotone*. The *Cause* I suppose to bee, for that those *Plants* require a Nourishment of great Moisture; And though the Nourishment of the *Stocke* be finer, and better prepared, yet it is not so moist, and plentifull, as the Nourishment of the *Earth*. And indeed we see those *Fruits* are very Cold *Fruits* in their Nature.

453 It hath beene received, that a Smaller *Peare*, grafted upon a *Stocke* that beareth a greater *Peare*, will become Great. But I thinke it is as true, as that of the *Prime-Fruit* upon the *Late Stocke*; And *è controverso*; which we rejected before: For the *Cions* will governe. Nevertheless it is probable enough, that if you can get a *Cions* to grow upon a *Stocke* of another kinde, that is much moyster than his own *Stocke*, it may make the *Fruit* Greater, because it will yeeld more plentifull Nourishment; Though it is like it will make the *Fruit* Baser. But generally the *Grafting* is upon a drier *Stock*; As the *Apple* upon a *Crab*; The *Peare* upon a *Thorne*; &c. Yet it is reported, that in the *Low-Countries* they will graft an *Apple-Cions* upon the *Stock* of a *Colewort*, and it will beare a great flaggy *Apple*; The *Kernell* of which, if it be set, will bee a *Colewort*, and not an *Apple*. It were good to trie, whether an *Apple-Cions* will prosper, if it be grafted upon a *Sallow*, or upon a *Poplar*, or upon an *Alder*, or upon an *Elme*, or upon an *Horse-Plumme*, which are the moystest of *Trees*. I have heard that it hath beene tried upon an *Elme*, and succeeded.

454 It is manifest by Experience, that *Flowers* Removed wax greater, because the Nourishment is more easily come by, in the loose Earth. It may bee, that Oft Regrafting of the same Cions, may likewise make *Fruit* greater; As if you take a *Cions*, and graft it upon a *Stocke* the first yeare; And then cut it off, and graft it upon another *Stock* the second yeare; and so for a third; Or fourth yeare; And then let it rest, it will yeeld afterward, when it beareth, the greater *Fruit*.

Of Grafting *there are many* Experiments *worth the Noting, but those we reserve to a proper Place.*

455 It maketh *Figs* better, if a *Fig-Tree*, when it beginneth to put forth Leaves, have his Top cut off. The *Cause* is plaine, for that the Sap hath the lesse to feed, and the lesse way to mount: But it may be, the *Figge* will come somewhat later, as was formerly touched. The same may bee tried likewise in other *Trees*.

456 It is reported, that *Mulberries* will be fairer, and the *Trees* more fruitfull, if you bore the *Trunke* of the *Tree* thorow, in severall places, and thrust into the Places bored, Wedges of some Hot *Trees*, as *Turpentine*, *Mastick-Tree*, *Guaiacum*, *Iuniper*, &c. The *Cause* may bee, for that Adventive Heat doth cheare up the Native Juyce of the *Tree*.

457 It is reported, that *Trees* will grow greater, and beare better *Fruit*, if you put *Salt*, or *Lees* of *Wine*, or *Bloud* to the *Root*. The *Cause* may be the Encreasing

creasing the Lust or Spirit of the *Root*; These Things being more forcible, than ordinarie *Composts*.

458 It is reported by one of the Ancients, that *Artichoakes* will be lesse prickly, and more tender, if the *Seeds* have their Tops dulled, or grated off upon a Stone.

459 *Herbs* will be tenderer, and fairer; if you take them out of *Beds*, when they are newly come up, and remove them into *Pots*, with better *Earth*. The Remove from *Bed* to *Bed* was spoken of before; But that was in severall yeares; This is upon the sudden. The *Cause* is the same with other *Removes*, formerly mentioned.

460 *Coleworts* are reported by one of the *Ancients*, to prosper exceedingly, and to be better tasted, if they be sometimes watred with *Salt-water*; And much more with *Water* mixed with *Nitre*; The Spirit of which is lesse Adurent than *Salt*.

461 It is reported, that *Cucumbers* will prove more Tender, and Dainty, if their *Seeds* be *Steeped* (a little) in *Milke*; The *Cause* may be, for that the *Seed* being mollified with the *Milke*, will be too weake to draw the grosser Juyce of the Earth, but onely the finer. The same *Experiment* may be made in *Artichoakes*, and other *Seeds*, when you would take away, either their Flashinesse, or Bitternesse. They speake also, that the like Effect followeth, of *Steeping* in *Water* mixed with *Honey*; But that seemeth to me not so probable, because *Honey* hath too Quicke a Spirit.

462 It is reported that *Cucumbers* will be lesse *Watrie*, and more *Melon-like*, if in the Pit where you set them, you fill it (halfe way up) with *Chaffe*, or small *Sticks*, and then powre *Earth* upon them; For *Cucumbers*, as it seemeth, doe extremely affect Moisture; And over-drinke themselves; Which this *Chaffe*, or *Chips*, forbiddeth. Nay, it is further reported, that if when a *Cucumber* is growne, you set a Pot of water about five or six Inches distance from it, it will, in 24. houres, shoot so much out, as to touch the Pot; Which if it be true, it is an *Experiment* of an higher Nature, than belongeth to this *Title*: For it discovereth *Perception* in *Plants*, to move towards that which should help and comfort them, though it be at a distance. The ancient Tradition of the *Vine* is farre more strange: It is, that if you set a Stake, or Prop, some distance from it, it will grow that way; Which is farre stranger (as is said) than the other: For that *Water* may worke by a *Sympathie* of *Attraction*: But this of the *Stake* seemeth to be a Reasonable Discourse.

463 It hath been touched before, that *Terebration* of *Trees* doth make them prosper better. But it is found also, that it maketh the *Fruit* sweeter, and better. The *Cause* is, for that notwithstanding the *Terebration*, they may receive Aliment sufficient; And yet no more than they can well turne, and disgest; And withall doe sweat out the coursest and unprofitablest Juyce; Even as it is in *Living Creatures*, which by Moderate Feeding, and Exercise, and Sweat, attaine the soundest Habite of Body.

464 As *Terebration* doth *Meliorate Fruit*, so, upon the like reason, doth *Letting* of *Plants Bloud*; As *Pricking Vines*, or other *Trees*, after they be of some Growth; And thereby letting forth *Gumme*, or *Teares*; Though this be not to continue, as it is in *Terebration*, but at some Seasons. And it is reported, that by this Artifice, *Bitter Almonds* have beene turned into *Sweet*.

465 The Ancients for the *Dulcorating* of *Fruit*, doe commend *Swines-Dung* above all other *Dung*; Which may bee, because of the Moisture of that Beast, whereby the *Excrement* hath lesse Acrimony; For we see *Swines* and *Pigges* Flesh is the Moistest of Fleshes.

It

It is obſerved by ſome, that all *Herbs* wax ſweeter, both in Smell and Taſte, if after they be growne up ſome reaſonable time, they be cut, and ſo you take the later Sprout. The *Cauſe* may be for that the longer the Juyce ſtayeth in the Root, and Stalke, the better it concocteth. For one of the Chiefe Cauſes, why *Graines*, *Seeds*, and *Fruits*, are more Nouriſhing than *Leaves*, is the length of time, in which they grow to *Maturation*. It were not amiſſe to keepe backe the Sap of *Herbs*, or the like, by ſome fit meanes, till the end of Summer; whereby (it may be) they will be more Nouriſhing. 466

As *Grafting* doth generally advance and *Meliorate Fruits*, above that which they would be, if they were ſet of *Kernels*, or *Stones*, in regard the *Nouriſhment* is better concocted; So (no doubt) even in *Grafting*, for the ſame cauſe, the Choyce of the *Stocke* doth much; Alwayes provided, that it bee ſomewhat inferiour to the *Cions*: For otherwiſe it dulleth it. They commend much the *Grafting* of *Peares*, or *Apples*, upon a *Quince*. 467

Beſides the *Meanes* of *Melioration* of *Fruits*, before mentioned, it is ſet downe as tried, that a *Mixture* of *Bran*, and *Swines-Dung*; Or *Chaffe* and *Swines-Dung*; (eſpecially laid up together for a Moneth to rot,) is a very great Nouriſher, and Comforter to a *Fruit-Tree*. 468

It is delivered, that *Onions* wax greater, if they be taken out of the Earth, and laid a drying twenty dayes, and then ſet againe; And yet more, if the outermoſt Pill be taken off all over. 469

It is delivered by ſome, that if one take the *Bough* of a *Low-Fruit-tree*, newly budded, and draw it gently, without hurting it, into an *Earthen* Pot perforate at the bottome to let in the *Plant*, and then cover the *Pot* with Earth, it will yeeld a very large *Fruit*, within the Ground. Which *Experiment* is Nothing but *Potting* of *Plants*, without Removing, and Leaving the *Fruit* in the Earth. The like, (they ſay,) will be effected, by an Empty *Pot* without Earth in it, put over a *Fruit*, being propped up with a *Stake*, as it hangeth upon the *Tree*; And the better, if ſome few Pertuſions be made in the *Pot*. Wherein, beſides the Defending of the *Fruit*, from Extremity of Sunne or Weather, ſome give a reaſon, that the *Fruit*, Loving and Coveting the open Aire and Sunne, is invited by thoſe Pertuſions, to ſpread and approch, as neare the open Aire, as it can; And ſo enlargeth in *Magnitude*. 470

All *Trees*, in *High* and *Sandy Grounds*, are to be ſet deep; And in *Watry Grounds*, more ſhallow. And in all *Trees*, when they be removed (eſpecially *Fruit-Trees*) care ought to be taken, that the Sides of the *Trees* be coaſted, (*North* and *South*, &c.) as they ſtood before. The ſame is ſaid alſo of *Stone* out of the *Quarry*, to make it more durable; Though that ſeemeth to have leſſe reaſon; Becauſe the *Stone* lyeth not ſo neare the Sunne, as the *Tree* groweth. 471

Timber Trees in a *Coppice Wood*, doe grow better, than in an *Open Field*; Both becauſe, they offer not to ſpread ſo much, but ſhoot up ſtill in Height; And chiefly becauſe they are defended from too much Sunne and Winde, which doe checke the Growth of all *Fruit*; And ſo (no doubt) *Fruit-Trees*, or *Vines*, ſet upon a *Wall*, againſt the Sunne, betweene Elbowes or Buttreſſes of Stone, ripen more, than upon a Plain Wall. 472

It is ſaid, that if *Potado Roots*, be ſet in a *Pot* filled with Earth, and then the *Pot* with Earth be ſet likewiſe within the Ground, ſome two or three Inches, the *Roots* will grow greater, than Ordinary. The *Cauſe* may be, for that Having Earth enough within the *Pot* to nouriſh them; And then being ſtopped by the Bottome of the *Pot* from putting Strings downward, they muſt needs grow greater in Breadth, and Thickneſſe. And it may be, that 473

that all *Seeds* or *Roots*, *Potted*, and so set into the *Earth*, will prosper the better.

474 The *Cutting off* the *Leaves* of *Radish*, or other *Roots*, in the beginning of Winter, before they wither; And Covering againe the *Root*, something high with Earth; Will preserve the *Root* all Winter, and make it bigger, in the Spring following, as hath beene partly touched before. So that there is a double Use of this *Cutting off* the *Leaves*: For in *Plants*, where the *Root* is the *Esculent*, as *Radish*, and *Parsnips*, it will make the *Root* the greater: And so it will doe to the *Heads* of *Onions*. And where the *Fruit* is the *Esculent*, by Strengthning the *Root*, it will make the *Fruit* also the greater.

475 It is an *Experiment* of great pleasure, to make the *Leaves* of *Shady Trees*, larger than ordinary. It hath beene tryed (for certaine) that a *Cions* of a *Weech-Elme*, grafted upon the Stocke of an Ordinary *Elme*, will put forth Leaves, almost as broad as the Brimme of ones Hat. And it is very likely, that as in *Fruit-Trees*, the *Graft* maketh a greater *Fruit*; So in *Trees* that beare no *Fruit*, it will make the greater *Leaves*. It would be tried therefore in *Trees* of that kinde chiefly; As *Birch*, *Asp*, *Willow*; And especially the *Shining Willow*, which they call *Swallow-Taile*, because of the pleasure of the Leafe.

476 The *Barrennesse* of *Trees*, by *Accident*, (besides the *Weaknesse* of the *Soile*, *Seed*, or Root; And the *Injurie* of the *Weather*) commeth either of their *Over-growing* with *Mosse*; Or their being *Hide-bound*; Or their *Planting too deepe*; Or by *Issuing* of the *Sap too much into the Leaves*. For all these there are *Remedies* mentioned before.

Experiments in Consort, touching *Compound Fruits* and *Flowers*.

Wee see that in *Living Creatures*, that have *Male* and *Female*, there is Copulation of severall Kindes; and so *Compound Creatures*; As the *Mule*, that is generated betwixt the *Horse* and the *Asse*; And some other *Compounds*, which we call *Monsters*, though more rare: And it is held, that that *Proverbe*, *Africa semper aliquid Monstri parit*; commeth, for that the Fountains of Waters there, being rare, divers Sorts of Beasts come from severall Parts to drink; And so being refreshed, fall to couple, & many times with severall Kinds. The *Compounding* or *Mixture* of *Kinds* in *Plants* is not found out; which nevertheless, if it bee possible, is more at command than that of *living Creatures*; For that their Lust requireth a voluntary Motion: wherefore it were One of the most Notable *Experiments* touching *Plants*, to finde it out: For so you may have great Varietie of New *Fruits*, and *Flowers* yet unknowne. *Grafting* doth it not: That mendeth the *Fruit*, or doubleth the *Flowers*, &c. But it hath not the Power to make a *New Kinde*. For the *Cions* ever over-ruleth the *Stocke*.

477 It hath been set downe by one of the *Ancients*, that if you take two *Twigs* of severall *Fruit Trees*, and flat them on the Sides, and then binde them close together, and set them in the ground, they will come up in one Stocke; But yet they will put forth their severall *Fruits* without any *Commixture* in the *Fruit*. Wherein note (by the way) that *Vnity* of *Continuance*, is easier to procure,

procure, than *Vnitie* of *Species*. It is reported alſo that *Vines* of *Red* and *White Grapes*, being ſet in the Ground, and the upper Parts being flatted, and bound cloſe together, will put forth *Grapes* of the ſeverall Colours, upon the ſame Branch; And *Grape-Stones* of ſeverall Colours within the ſame *Grape*: But the more, after a yeare or two; The Unity (as it ſeemeth) growing more Perfect. And this will likewiſe helpe, if from the firſt *Vniting*, they be often Watred; For all Moiſture helpeth to *Vnion*. And it is preſcribed alſo, to binde the *Bud*, as ſoone as it commeth forth, as well as the *Stocke*; At the leaſt for a time.

They report, that divers *Seeds*, put into a *Clout*, and laid in Earth well dunged, will put up *Plants Contiguous*; Which (afterwards) being bound in, their *Shoots* will *Incorporate*. The like is ſaid of *Kernels*, put into a *Bottle*, with a Narrow Mouth, filled with Earth. 478

It is reported, that young *Trees* of ſeverall kindes, ſet contiguous without any binding, and very often Watred, in a *Fruitfull Ground*, with the very Luxury of the *Trees*, will incorporate, and grow together. Which ſeemeth to me the likelieſt Meanes, that hath beene propounded; For that the *Binding* doth hinder the Naturall Swelling of the *Tree*; which, while it is in Motion, doth better *unite*. 479

Experiments in Conſort touching the *Sympathy* and *Antipathy* of *Plants*.

There are many Ancient and Received Traditions and Obſervations, touching the *Sympathy* and *Antipathy* of *Plants*; For that ſome will thrive beſt growing neare others; which they impute to *Sympathy*: And ſome worſe; wch they impute to *Antipathy*. But theſe are Idle & Ignorant Conceits; And forſake the true *Indication* of the *Cauſes*; As the moſt Part of *Experiments*, that concerne *Sympathies* and *Antipathies* doe. For as to *Plants*, neither is there any ſuch Secret *Friendſhip*, or *Hatred*, as they imagine; And if we ſhould be content to call it *Sympathy*, and *Antipathy*, it is utterly miſtaken; For their *Sympathy* is an *Antipathy*, and their *Antipathy* is a *Sympathy*: For it is thus; Wherefoever one *Plant* draweth ſuch a particular Juyce out of the Earth; as it qualifieth the Earth; So as that Juyce which remaineth is fit for the other Plant, there the Neighbourhood doth good; Becauſe the Nouriſhments are contrarie, or ſeverall: But where two *Plants* draw (much) the ſame Juyce, there the Neighbourhood hurteth; For the one deceiveth the other.

First therefore, all *Plants* that doe draw much *Nouriſhment* from the *Earth*, and ſo ſoake the Earth, and exhauſt it; hurt all Things that grow by them; As Great *Trees*, (eſpecially *Aſhes*,) and ſuch *Trees*, as ſpread their *Roots*, neare the Top of the Ground. So the *Colewort* is not an Enemy (though that were anciently received) to the *Vine* onely; But it is an Enemy to any other *Plant*; Becauſe it draweth ſtrongly the fatteſt Juyce of the Earth. And if it be true, that the *Vine*, when it creepeth neare the *Colewort*, will turne away; This may be, becauſe there it findeth worſe Nouriſhment; For though the *Root* be where it was, yet (I doubt) the *Plant* will bend as it nouriſheth. 480

481 Where *Plants* are of ſeverall Natures, and draw ſeverall Juyces out of the Earth, there (as hath been ſaid) the One ſet by the other helpeth: As it is ſet down by divers of the Ancients, that *Rew* doth proſper much, and becommeth ſtronger, if it bee ſet by a *Figge-Tree*: which (wee conceive) is cauſed, Not by Reaſon of *Friendſhip*, but by *Extraction* of a Contrary Juyce: The one Drawing *Iuyce* fit to reſult Sweet, the other bitter. So they have ſet downe likewiſe, that a *Roſe* ſet by *Garlick* is ſweeter: Which likewiſe may be, becauſe the more Fetide Juyce of the Earth goeth into the *Garlick*; And the more Odorate into the *Roſe*.

482 This wee ſee manifeſtly, that there be certaine *Corne-Flowers*, which come ſeldome or never in other places, unleſſe they be ſet; But onely amongſt Corne: As the *Blew-Bottle*, a kinde of *Yellow Mary-Gold*, *Wilde Poppy*, and *Fumitory*. Neither can this be, by Reaſon of the Culture of the Ground, by Plowing, or Furrowing; As ſome *Herbs*, and *Flowers*, will grow but in *Ditches* new Caſt; For if the *Ground* lie fallow, and unſowne, they will not come: So as it ſhould ſeeme to be the *Corne*, that qualifieth the Earth, and prepareth it for their Growth.

483 This Obſervation, if it holdeth, (as it is very probable,) is of great uſe, for the *Meliorating* of *Taſte* in *Fruits*, and *Eſculent Herbs*; And of the *Sent* of *Flowers*. For I doe not doubt, but if the *Figge-Tree* doe make the *Rew* more ſtrong, and bitter, (as the Ancients have noted,) good ſtore of *Rew* planted about the *Figge-Tree*, will make the *Figge* more ſweet. Now the *Taſtes* that doe moſt offend in *Fruits*, and *Herbs*, and *Roots*, are *Bitter*; *Harriſh*; *Sowre*; And *Watriſh*, or *Flaſhy*. It were good therefore to make the *Trials* following.

484 Take *Wormewood*, or *Rew*, and ſet it neare *Lettuce*, or *Coleflory*, or *Artichoake*; And ſee whether the *Lettuce*, or the *Coleflorie*, &c. become not the ſweeter.

485 Take a *Service-Tree*, or a *Cornelian-tree*, or an *Elder-Tree*, which we know have *Fruits* of harſh and binding Juyce, and ſet them neare a *Vine*, or *Figge-Tree*, and ſee whether the *Grapes*, or *Figges*, will not be the ſweeter.

486 Take *Cucumbers*, or *Pumpions*, and ſet them (here and there) amongſt *Musk-Melons*, and ſee whether the *Melons* will not be more Winy, and better taſted. Set *Cucumbers* (likewiſe) amongſt *Radiſh*, and ſee whether the *Radiſh* will not be made the more Biting.

487 Take *Sorrell*, and ſet it amongſt *Raſps*, and ſee whether the *Raſps* will not be the ſweeter.

488 Take *Common Briar*, and ſet it amongſt *Violets*, or *Wall-Flowers*, and ſee whether it will not make the *Violets*, or *Wall-Flowers* ſweeter, and leſſe Earthy in their Smell. So ſet *Lettuce*, or *Cucumbers*, amongſt *Roſemary*, or *Bayes*, and ſee whether the *Roſemary*, or *Bayes* will not be the more Odorate, or Aromaticall.

489 Contrariwiſe, you muſt take heed, how you ſet *Herbs* together, that draw much the like Juyce. And therefore I thinke *Roſemary* will leeſe in Sweetneſſe, if it be ſet with *Lavender*, or *Bayes*, or the like. But yet, if you will correct the ſtrength of an Herbe, you ſhall doe well to ſet other like Herbs by him, to take him downe; And if you ſhould ſet *Tanſey* by *Angelica*, it may bee, the *Angelica* would be the weaker, and fitter for Mixture in Perfume. And if you ſhould ſet *Rew* by *Common Wormewood*, it may be, the *Wormewood* would turne to be liket *Roman wormewood*.

490 This *Axiome* is of large extent; And therefore would be ſevered, and refined by *Tryall*. Neither muſt you expect to have a *Groſſe Difference* by this kinde of Culture, but only *Further Perfection*. Triall

Triall would bee also made in *Herbs Poysonous*, and *Purgative*, whose ill Qualitie (perhaps) may be discharged, or attempred, by Setting stronger *Poysons*, or *Purgatives*, by them. 491

It is reported, that the *Shrub* called *Our Ladies Seale*; (which is a Kinde of *Briony*,) and *Coleworts*, set neare together, one or both will die. The *Cause* is, for that they be both great Depredatours of the Earth, and one of them starveth the other. The like is said of a *Reed*, and a *Brake*; Both which are succulent; And therefore the One deceiveth the Other. And the like of *Hemlock* and *Rew*; Both which draw strong Juyces. 492

Some of the Ancients, and likewise divers of the Moderne Writers, that have laboured in *Naturall Magick*, have noted a *Sympathy*, between the *Sunne*, *Moone*, and some Principall *Starres*; And cetaine *Herbs*, and *Plants*. And so they have denominated some *Herbs Solar*, and some *Lunar*; And such like Toyes put into great Words. It is manifest, that there are some *Flowers*, that have *Respect* to the *Sunne*, in two *Kindes*; The one by *Opening* and *Shutting*; And the other by *Bowing* and *Inclining* the *Head*. For *Mary-golds*, *Tulippa's*, *Pimpernell*, and indeed most *Flowers*, doe open or spread their Leaves abroad, when the *Sunne* shineth serene and faire: And againe, (in some part,) close them, or gather them inward, either towards Night, or when the Skie is overcast. Of this there needeth no such Solemne Reason to be assigned; As to say, that they rejoyce at the presence of the Sunne; And mourne at the absence thereof. For it is Nothing else, but a little Loading of the Leaves, and Swelling them at the Bottome, with the Moisture of the Aire; whereas the drie Aire doth extend them: And they make it a Peece of the wonder, that *Garden Clover* will hide the *Stalke*, when the *Sunne* sheweth bright; Which is nothing, but a full Expansion of the leaves. For the *Bowing* and *Inclining* the *Head*; it is found in the great *Flower* of the *Sunne*; in *Marigolds*; *Wart-wort*; *Mallow Flowers*; and others. The *Cause* is somewhat more Obscure than the former; But I take it to bee no other, but that the Part against which the *Sunne* beateth, waxeth more faint and flaccide in the Stalke; And therby lesse able to support the *Flower*. 493

What a little *Moisture* will doe in *Vegetables*, even though they be dead, and severed from the Earth, appeareth wel in the *Experiment* of *Iuglers*. They take the *Beard* of an *Oate*; which (if you marke it well,) is wreathed at the Bottome, and one smooth entire Straw at the Top. They take onely the Part that is Wreathed, and cut off the other, leaving the *Beard* halfe the Breadth of a Finger in length. Then they make a little *Crosse* of a *Quill*, long-wayes of that Part of the *Quill*, which hath the Pith; And Crosse-wayes of that Peece of the *Quill* without Pith; The whole *Crosse* being the Breadth of a Finger high. Then they pricke the Bottome where the *Pith* is, and thereinto they put the *Oaten-beard*, leaving halfe of it sticking forth of the *Quill*: Then they take a little white Box of wood, to deceive Men, as if somewhat in the Box did worke the Feat: In which, with a Pinne, they make a little Hole, enough to take the *Beard*, but not to let the *Crosse* sinke downe, but to stick. Then likewise by way of Imposture, they make a Question; As, Who is the Faireſt Woman in the Company? Or, Who hath a Glove, or Card? And cause Another to name divers Persons: And upon every Naming, they stick the *Crosse* in the Box, having first put it towards their mouth, as if they charmed it; And the *Crosse* stirreth not; But when they come to the Person that they would take; As they hold the *Crosse* to their Mouth, they touch the *Beard* with the Tip of their Tongue, and wet it; And so stick the *Crosse* in the Box; And then you shall see it turne finely and 494

and ſoftly, three or foure Turnes; which is cauſed by the untwining of the *Beard* by the Moiſture. You may ſee it more evidently, if you ſticke the Croſſe betweene your fingers, in ſtead of the Box; And therefore you may ſee, that this Motion, which is Effected by ſo little Wet, is ſtronger than the Cloſing or Bending of the Head of a *Marigold*.

495 It is reported by ſome, that the *Herbe* called *Roſa-Solis*, (whereof they make Strong Waters,) will at the Noone-day, when the *Sunne* ſhineth hot and bright, have a great Dew upon it. And therefore, that the right Name is *Ros Solis*: which they impute to a Delight and *Sympathy*, that it hath with the Sunne. Men favour Wonders. It were good firſt to be ſure, that the Dew that is found upon it, be not the Dew of the Morning Preſerved, when the Dew of other *Herbs* is breathed away; for it hath a ſmooth and thick Leafe, that doth not diſcharge the Dew ſo ſoone, as other *Herbs* that are more Spungy and Porous. And it may be Purſlane, or ſome other Herbe, doth the like, and is not marked. But if it be ſo, that it hath more Dew at Noon, than in the Morning, then ſure it ſeemeth to be an Exudation of the *Herbe* it ſelfe. As Plummes ſweat when they are ſet into the Oven: for you will not (I hope) thinke, that it is like *Gedeons Fleece* of *Wooll*, that the *Dew* ſhould fall upon that, and no where elſe.

496 It is certaine, that the *Honey-dews*, are found more upon *Oake-leaves*, than upon *Aſh*, or *Beech*, or the like: But whether any *Cauſe* be, from the *Leafe* it ſelfe, to concoct the Dew; Or whether it be onely, that the *Leafe* is Cloſe and Smooth; (And therefore drinketh not in the Dew, but preſerveth it;) may be doubted. It would be well inquired, whether *Manna* the *Drug*, doth fall but upon certaine *Herbs* or *Leaves* onely. *Flowers* that have deep *Sockets*, doe gather in the Bottome, a kinde of *Honey*; As *Honey-Suckles*; (both the *Woodbine*, and the *Trifoile*;) *Lillies*; and the like. And in them certainly the *Flower* beareth part with the *Dew*.

497 The Experience is, that the *Froth*, which they call *Woodeſare*, (being like a kinde of Spittle,) is found but upon certaine *Herbs*, and thoſe hot Ones; As *Lavender*, *Lavender-cotton*, *Sage*, *Hyſſope*, &c. Of the *Cauſe* of this enquire further; For it ſeemeth a Secret. There falleth alſo *Mildew* upon *Corne*, and ſmutteth it; But it may be, that the ſame falleth alſo upon other *Herbs*, and is not obſerved.

498 It were good, Triall were made, whether the great Conſent betweene *Plants* and *Water*, which is a principall Nouriſhment of them, will make an *Attraction* or Diſtance, and not at Touch onely. Therefore take a *Veſſell*, and in the middle of it make a falſe Bottome of courſe Canvaſſe: Fill it with Earth above the Canvaſſe, and let not the Earth be watred; Then ſow ſome good *Seeds* in that Earth; But under the Canvaſſe, ſome halfe a foot in the Bottome of the Veſſell, lay a great *Spunge*, thorowly wet in water; And let it lye ſo ſome ten Dayes; And ſee whether the *Seeds* will ſprout, and the *Earth* become more Moiſt, and the *Spunge* more drie. The *Experiment* formerly mentioned of the *Cucumber*, creeping to the Pot of Water, is farre ſtranger than this.

Experiments in Conſort, touching the *Making Herbs* and *Fruits Medicinable*.

499 THe *Altering* of the *Sent*, *Colour*, or *Taſte* of *Fruit*, by *Infuſing*, *Mixing*, or *Letting* into the *Barke*, or *Root* of the *Tree*, *Herbe*, or *Flower*, any *Coloured*, *Aromaticall*, or *Medicinall* Subſtance; are but *Fancies*. The *Cauſe* is, for that thoſe Things have paſſed their Period, and nouriſh not. And all *Alteration* of Vegetables, in thoſe Qualities, muſt be by ſomewhat, that is apt to go into the Nouriſhment of the *Plant*. But this is true; that where *Kine* feed upon

Wilde

Wilde Garlicke, their *Milke* tasteth plainely of the *Garlicke:* And the Flesh of *Muttons* is better tasted where the *Sheepe* feed upon *Wilde Thyme*, and other wholesome *Herbs*. *Galen* also speaketh of the Curing of the *Scirrus* of the *Liver*, by *Milke* of a *Cow*, that feedeth upon certaine *Herbs*; And *Honey* in *Spaine* smelleth (apparently) of the *Rosemary*, or *Orenge*, from whence the *Bee* gathereth it: And there is an old Tradition of a *Maiden* that was fed with *Napellus*; (which is counted the Strongest poyson of all *Vegetables*; which with use did not hurt the *Maid*, but poisoned some that had Carnall Company with her. So it is observed by some, that there is a vertuous *Bezoar*, and another without vertue; which appeare to the shew alike; But the Vertuous is taken from the Beast, that feedeth upon the Mountaines, where there are *Theriacall Herbs*; And that without Vertue, from those that feed in the Valleys, where no such *Herbs* are. Thus farre I am of Opinion; That as Steeped Wines and Beeres, are very *Medicinall*; And likewise Bread tempred with divers Powders; So of *Meat* also, (as *Flesh*, *Fish*, *Milke*, and *Egges*,) that they may be made of great use for *Medicine*, and *Diet*, if the *Beast*, *Foule*, or *Fish*, be fed with a speciall kinde of food, fit for the Disease. It were a dangerous Thing also for secret Empoysonments. But whether it may be applyed unto *Plants*, and *Herbs*, I doubt more; Because the Nourishment of them is a more common Juyce; which is hardly capable of any speciall Qualitie, untill the *Plant* doe assimilate it.

But least our Incredulitie may prejudice any profitable Operations in this kinde, (especially since Many of the Ancients have set them downe,) Wee thinke good briefly to propound the foure *Meanes*, which they have devised of Making *Plants Medicinable*. The First is by *Slitting* of the *Root*, and *Infusing* into it the *Medicine*; As *Hellebore*, *Opium*, *Scammony*, *Triacle*, &c. And then binding it up againe. This seemeth to me the least probable; Because the *Root* draweth immediately from the Earth; And so the Nourishment is the more Common, and lesse Qualified: And besides, it is a long time in Going up, ere it come to the *Fruit*. The Second Way is, to *Perforate* the *Body* of the *Tree*, and there to *Infuse* the *Medicine:* Which is somewhat better: For if any Vertue be received from the *Medicine*, it hath the lesse way, and the lesse time to goe up. The Third is, the *Steeping* of the *Seed* or *Kernell* in some *Liquour*, wherein the *Medicine* is *Infused:* Which I have little Opinion of, because the *Seed*, (I doubt,) will not draw the Parts of the *Matter*, which have the *Propriety:* But it will be farre the more likely, if you mingle the *Medicine* with *Dung*; For that the *Seed* naturally drawing the *Moisture* of the *Dung*, may call in withall some of the *Propriety*. The fourth is, the *Watering* of the *Plant oft*, with an *Infusion* of the *Medicine*. This, in one respect may have more force than the rest; Because the *Medicaton* is oft renewed; Whereas the rest are applyed but at one time: And therefore the Vertue may the sooner vanish. But still I doubt, that the *Root* is somewhat too stubborne to receive those fine *Impressions*; And besides, (as I said before,) they have a great *Hill* to goe up. I judge therfore the likeliest way to be the *Perforation* of the *Body* of the *Tree*, in *severall places*, *one above the other*; And the *Filling* of the *Holes* with *Dung mingled with the Medicine*. And the *Watring* of those *Lumps* of *Dung*, with Squirts of an *Infusion* of the *Medicine* in *Dunged Water*, once in three or foure Dayes.

500

NATU-

NATVRALL HISTORIE.

VI. Century.

Experiments in Consort touching *Curiosities* about *Fruits* and *Plants*.

OUR *Experiments* wee take care to bee, (as wee have often said,) either *Experimenta Fructifera*, or *Lucifera*; Either of *Vse*, or of *Discovery*: For wee hate *Impostures*; And despise *Curiosities*. Yet because wee must apply our Selves somewhat to Others, we will set down some *Curiosities* touching *Plants*.

501 It is a *Curiositie*, to have *severall Fruits* upon *one Tree*; And the more, when some of them come *Earely*, and some come *Late*; So that you may have, upon the same *Tree*, Ripe *Fruits* all Sommer. This is easily done, by Grafting of severall *Cions*, upon severall Boughes, of a Stock, in a good Ground, plentifully fed. So you may have all Kindes of *Cherries*, and all kindes of *Plums*, and *Peaches*, and *Apricots*, upon one *Tree*; But I conceive the *Diversitie* of *Fruits* must be such, as will graft upon the same Stock. And therefore I doubt, whether you can have *Apples*, or *Peares*, or *Orenges*, upon the same Stocke, upon which you graft *Plums*.

502 It is a *Curiosity* to have *Fruits* of *Divers Shapes*, and *Figures*. This is easily performed by Moulding them, when the *Fruit* is young, with Moulds of Earth, or Wood. So you may have *Cucumbers*, &c. as Long as a Cane; Or as round as a Spheare; Or formed like a Crosse. You may have also *Apples*, in the forme of *Peares*, or *Limons*. You may have also *Fruit* in more Accurate Figures; As we said of *Men*, *Beasts*, or *Birds*, according as you make the Moulds. Wherein you must understand, that you make the Mould big enough, to containe the whole *Fruit*, when it is growne to the greatest: For else you will choake the Spreading of the *Fruit*; Which otherwise would spread it selfe, and fill the Concave, and so be turned into the *Shape* desired; As it is in Mould workes of Liquid things. Some doubt may be conceived,

ceived, that the Keeping of the Sunne from the *Fruit*, may hurt it: But there is ordinary experience of *Fruit* that groweth Covered. *Quære* also, whether some small Holes, may not be made in the Wood, to let in the Sunne. And note, that it were best to make the Moulds partible, glued, or cemented together, that you may open them, when you take out the *Fruit*.

503 It is a *Curiosity*, to have *Inscriptions*, or *Engravings*, in *Fruit*, or *Trees*. This is easily performed, by *Writing* with a *Needle*, or *Bodkin*, or *Knife*, or the like, when the *Fruit*, or *Trees* are young; For as they grow, so the Letters will grow more large, and Graphicall.

——Tenerisque meos incidere Amores
Arboribus, crescent illæ, crescetis Amores.

504 You may have *Trees apparelled* with *Flowers*, or *Herbs*, by *Boring Holes* in the *Bodies* of them, and Putting into them *Earth holpen* with *Mucke*, and *Setting Seeds*, or *Slips*, of *Violets*, *Strawberries*, *Wilde-Thyme*, *Camomill*, and such like in the *Earth*. Wherein they doe but grow, in the *Tree*, as they doe in *Pots*; Though (perhaps) with some Feeding from the *Trees*. It would bee tried also with *Shoots* of *Vines*, and *Roots* of *Red-Roses*; For it may be, they being of a more Ligneous Nature, will incorporate with the *Tree* it selfe.

505 It is an ordinary *Curiosity*, to *Forme Trees* and *Shrubs*, (as *Rosemary*, *Iuniper*, and the like,) into *Sundry Shapes*; which is done by Moulding them within, and Cutting them without. But they are but lame Things, being too small to keepe Figure: Great *Castles* made of *Trees* upon Frames of Timber, with Turrets, and Arches, were anciently matters of Magnificence.

506 Amongst *Curiosities*, I shall place *Colouration*, though it be somewhat better: For *Beauty* in *Flowers* is their Preheminence. It is observed by some, that *Gilly-Flowers*, *Sweet-Williams*, *Violets*, that are *Coloured*, if they be neglected, and neither Watered, nor New Moulded, nor Transplanted, will turne *White*. And it is probable, that the *White* with much culture, may turne *Coloured*. For this is certaine, that the *White Colour* commeth of Scarcity of Nourishment; Except in Flowers that are onely *White*, and admit no other *Colours*.

507 It is good therefore, to see what *Natures* doe accompany what *Colours*; For by that you shall have Light, how to induce *Colours*, by Producing those *Natures*. *Whites* are more Inodorate, (for the most part,) than *Flowers* of the same kinde *Coloured*; As is found in *Single White Violets*, *White-Roses*, *White Gilly-Flowers*, *White Stock-Gilly-Flowers*, &c. We finde also, that *Blossomes* of *Trees*, that are *White*, are commonly Inodorate, As *Cherries*, *Peares*, *Plums*; Whereas those of *Apples*, *Crabs*, *Almonds*, and *Peaches*, are Blushy, and Smell sweet. The *Cause* is, For that the Substance that Maketh the *Flower*, is of the thinnest and finest of the *Plant*; Which also maketh *Flowers* to be of so dainty *Colours*. And if it be too Sparing, and Thinne, it attaineth no Strength of Odour; Except it be in such *Plants*, as are very Succulent; Whereby they need rather to be scanted in their Nourishment, than replenished, to have them sweet. As wee see in *White Satyrion*, which is of a Dainty Smell; And in *Beane-Flowers*, &c. And againe, if the *Plant* be of Nature, to put forth *White Flowers* onely, and those not thinne, or drie, they are commonly of rancke and fulsome Smell; As *May-Flowers*, and *White Lillies*.

508 Contrariwise, in *Berries*, the *White* is commonly more Delicate, and Sweet in Taste, than the *Coloured*; As wee see in *White Grapes*; In *White Raspes*; In *White Strawberries*; In *White Currans*, &c. The *Cause* is, for that the

the *Coloured* are more juyced, and courser jnyced; And therefore not so well and equally Concocted; But the *White* are better proportioned, to the Disgestion of the *Plant*.

But in *Fruits*, the *White* commonly is meaner; As in *Peare-Plums*, *Damasins*, &c. And the Choicest *Plummes* are Blacke; The *Mulberrie*, (which though they call it a *Berry*, is a *Fruit*,) is better the *Blacke*, than the *White*. The *Harvest White-Plumme*, is a base *Plumme*; And the *Verdoccio* and *White Date-Plumme*, are no very good *Plummes*. The *Cause* is, for that they are all Overwatry: Whereas an higher Concoction is required for Sweetnesse, or Pleasure of Taste; And therefore all your dainty *Plummes*, are a little drie, and come from the Stone; As the *Muskle-Plumme*, the *Damasin-Plumme*, the *Peach*, the *Apricot*, &c. Yet some *Fruits*, which grow not to be *Blacke*, are of the Nature of *Berries*, sweetest such as are Paler; As the *Cœur-Cherry*, which inclineth more to *White*, is sweeter than the *Red*; But the *Egriot* is more sowre. 509

Take *Gilly-Flower Seed*, of one kinde of *Gilly-Flower*: (As of the *Clove-Gilly-Flower*, which is the most Common;) And sow it; And there will come up *Gilly-Flowers*, some of one *Colour*, and some of another, casually, as the *Seed* meeteth with Nourishment in the Earth; So that the *Gardiners* finde, that they may have two or three *Roots* amongst an hundred, that are rare, and of great Price; As *Purple*, *Carnation* of severall *Stripes*; The *Cause* is, (no doubt,) that in *Earth*, though it be contiguous, and in one Bed, there are very severall *Iuyces*; And as the *Seed* doth casually meet with them, so it commeth forth. And it is noted especially, that those which do come up *Purple*, doe alwayes come up Single; The *Iuyce*, as it seemeth, not being able to suffice a *Succulent Colour*, and a *Double Leafe*. This *Experiment* of severall *Colours*, comming up from one *Seed*, would bee tried also in *Larkes-Foot*, *Monkes-Hood*, *Poppey*, and *Hollyoke*. 510

Few *Fruits* are coloured *Red* within; The *Queene-Apple* is; And another *Apple*, called the *Rose-Apple*; *Mulberries* likewise; and *Grapes*, though most toward the Skinne. There is a *Peach* also, that hath a Circle of *Red* towards the Stone: And the *Egriot-Cherry* is somewhat *Red* within; But no *Peare*, nor *Warden*, nor *Plumme*, nor *Apricot*, although they have (many times) *Red* sides, are Coloured *Red* within. The *Cause* may be enquired. 511

The generall *Colour* of *Plants* is *Greene*; which is a *Colour* that no *Flower* is of. There is a *Greenish Prime-Rose*, but it is *Pale*, and scarce a *Greene*; The *Leaves* of some *Trees* turne a little *Murry*, or *Reddish*; And they bee commonly *Young Leaves* that doe so; As it is in *Oakes*, and *Vines*, and *Hasle*. *Leaves* rot into a *Yellow*; And some *Hollies* have part of their *Leaves Yellow*, that are, (to all seeming,) as Fresh and Shining, as the *Greene*. I suppose also, that *Yellow* is a lesse Succulent *Colour*, than *Greene*; And a degree nearer *White*. For it hath beene noted, that those *Yellow Leaves* of *Holly* stand ever towards the *North*, or *North-East*. Some *Roots* are *Yellow*, as *Carrets*; And some *Plants Bloud-Red*, Stalke and Leafe, and all; As *Amaranthus*. Some *Herbes* incline to *Purple*, and *Red*; As a Kinde of *Sage* doth, and a Kinde of *Mint*, and *Rosa Solis*, &c. And some have *White Leaves*, as another Kinde of *Sage*, and another Kinde of *Mint*; But *Azure* and a *Faire Purple*, are never found in *Leaves*. This sheweth that *Flowers* are made of a refined Juyce, of the Earth; And so are *Fruits*: But *Leaves* of a more Course, and Common. 512

It is a *Curiosity* also to make *Flowers Double*; Which is effected by *Often Removing* them into *New Earth*; As on the contrary Part, *Double Flowers*, 513

by neglecting, and not Removing, prove *Single*. And the Way to doe it speedily, is to sow or set *Seeds*, or *Slips* of *Flowers*; And as soone as they come up, to remove them into new Ground, that is good. Enquire also, whether *Inoculating* of *Flowers*, (as *Stock-Gilly-Flowers*, *Roses*, *Musk-Roses*, &c. doth not make them *Double*. There is a *Cherry-Tree*, that hath *Double Blossomes*: But that *Tree* beareth no *Fruit*; And, it may be, that the same Meanes, which applyed to the *Tree*, doth extremely accelerate the Sap to rise, and Breake forth; Would make the *Tree* spend it selfe in *Flowers*, and those to become *Double*; Which were a great pleasure to see; Especially in *Apple-Trees*, *Peach-Trees*, and *Almond-Trees*, that have *Blossomes Blush-Coloured*.

514 The *Making* of *Fruits* without *Core* or *Stone*, is likewise a *Curiositie*; And somewhat better: Because whatsoever maketh them so, is like to make them more Tender and Delicate. If a *Cions* or *Shoot*, fit to be set in the Ground, have the *Pith* finely taken forth, (and not altogether, but some of it left, the better to save the life, it will beare a *Fruit* with little, or no *Core*, or *Stone*. And the like is said to be, of dividing a *Quick-Tree* downe to the Ground, and Taking out the *Pith*, and then binding it up againe.

515 It is reported also, that a *Citron* grafted upon a *Quince*, will have small or no *Seeds*; And it is very probable, that any *Sowre-Fruit* grafted upon a *Stocke*, that beareth a *Sweeter Fruit* may both make the *Fruit* sweeter, and more void of the harsh Matter of *Kernels*, or *Seeds*.

516 It is reported, that not onely the *Taking out* of the *Pith*, but the *Stopping* of the *Iuyce* of the *Pith*, from Rising in the Middest, and *Turning* it to rise on the Outside, will make the *Fruit* without *Core*, or *Stone*; As if you should boare a *Tree* cleane thorow, and put a wedge in. It is true, there is some Affinitie betweene the *Pith* and the *Kernell*, because they are both of a harsh Substance, and both placed in the Middest.

517 It is reported that *Trees watred* perpetually with *Warme Water*, will make a *Fruit*, with little or no *Core* or *Stone*. And the Rule is generall, that whatsoever will make a *Wilde-Tree*, a *Garden-Tree*, will make a *Garden-Tree* to have lesse *Core*, or *Stone*.

Experiments in Consort, touching the *Degenerating* of *Plants*; And of the *Transmutation* of them, one into another.

THe Rule is certaine, that *Plants* for want of Culture, *degenerate* to be baser in the same Kinde; And sometimes so farre, as to change into another Kinde. 1. The *Standing long*, and not being *Removed*, maketh them *degenerate*. 2. *Drought*, unlesse the Earth of it selfe bee moist, doth the like. 3. So doth *Removing into worse Earth*, or *Forbearing to compost the Earth*; As wee see that *Water-Mint* turneth into *Field Mint*; And the *Colewort* into *Rape* by Neglect, &c.

518 519 Whatsoever *Fruit* useth to be set upon a *Root*, or a *Slip*, if it be *sowne*, will *degenerate*. *Grapes sowne*, *Figs*, *Almonds*, *Pomgranate Kernels sowne*; make the *Fruits degenerate*, and become Wilde. And againe, Most of those *Fruits* that use to be *grafted*, if they be set of *Kernels*, or *Stones*, *degenerate*. It is true, that *Peaches*, (as hath beene touched before,) doe better upon *Stones Set*, than upon *Grafting*: And the Rule of Exception should seeme to be this; That whatsoever *Plant* requireth much Moisture, prospereth better upon the *Stone*, or *Kernell*, than upon the *Graft*. For the Stocke, though it giveth a finer Nourishment, yet it giveth a scanter, than the Earth at large.

520 *Seeds*, if they bee very *Old*, and yet have strength enough to bring forth a *Plant*, make the *Plant degenerate*. And therefore skilfull Gardiners make triall of the *Seeds*, before they buy them, whether they be good or no, by Putting them

them into Water gently Boyled; And if they bee good, they will sprout within halfe an Houre.

It is strange which is reported, that *Basill* too much exposed to the *Sunne*, doth turne into *Wilde Time*: Although those two *Herbs* seeme to have small Affinity; but *Basill* is almost the onely Hot *Herbe*, that hath Fat and Succulent *Leaves*; Which Oylinesse, if it be drawne forth by the Sunne, it is like it will make a very great Change. 521

There is an old Tradition, that *Boughs of Oake*, put into the Earth, will put forth *Wilde Vines*: Which if it be true, (no doubt,) it is not the *Oake* that turneth into a *Vine*, but the *Oake-Bough* Putrifying, qualifieth the Earth, to put forth a *Vine* of it selfe. 522

It is not impossible, and I have heard it verified, that upon *Cutting downe* of an Old *Timber-Tree*, the *Stub* hath put out sometimes a *Tree* of another Kinde; As that *Beech* hath put forth *Birch*; Which, if it be true, the *Cause* may be, for that the old *Stub* is too scant of Juyce, to put forth the former *Tree*; And therefore putteth forth a *Tree* of a smaller kinde, that needeth lesse Nourishment. 523

There is an Opinion in the Countrey, that if the same *Ground* be *oft sowen*, with the *Graine* that *grew upon it*, it will, in the end, grow to bee of a baser kinde. 524

It is certaine, that in very *Sterile Yeares*, *Corne sowne* will grow to an *Other Kinde*. 525

Grandia sæpè quibus mandavimus Hordea Sulcis,
Infœlix Lolium, & steriles dominantur Avenæ.

And generally it is a Rule, that *Plants* that are brought forth by *Culture*, as *Corne*, will sooner change into other *Species*, than those that come of themselves: For that *Culture* giveth but an Adventitious Nature, which is more easily put off.

This worke of the *Transmutation* of *Plants*, one into another, is *inter Magnalia Naturæ*: For the *Transmutation* of *Species* is, in the vulgar philosophy, pronounced Impossible: And certainly it is a thing of difficultie, and requireth deep Search into Nature: But seeing there appeare some manifest *Instances* of it, the Opinion of Impossibilitie is to bee rejected; And the Meanes thereof to be found out. Wee see, that in *Living Creatures*, that come of *Putrefaction*, there is much *Transmutation*, of one into another; As *Caterpillers* turne into *Flies*, &c. And it should seeme probable, that whatsoever *Creature*, having life, is generated without *Seed*, that *Creature* will change out of one *Species* into another. For it is the *Seed*, and the Nature of it, which locketh and boundeth in the *Creature*, that it doth not expatiate. So as we may well conclude, that seeing the Earth, of it selfe, doth put forth *Plants*, without *Seed*, therefore *Plants* may well have a *Transmigration* of *Species*. Wherefore wanting *Instances*, which doe occurre, wee shall give Directions of the most likely *Tryalls*: And generally, we would not have those, that

that read this Worke of *Sylva Sylvarum*, account it strange, or thinke that it is an Over-Haste, that we have set downe Particulars untried; For contrariwise, in our owne Estimation, wee account such Particulars, more worthy, than those that are already tried and knowne. For these Later must be taken as you finde them; But the Other doe levell Point blank at the *Inventing* of *Causes*, and *Axiomes*.

526 First, therefore you must make account, that if you will have one *Plant* change into another, you must have the *Nourishment* over-rule the *Seed*: And therefore you are to practise it by *Nourishments* as contrary, as may bee, to the *Nature* of the *Herbe*; So nevertheleſſe as the *Herb* may grow; And likewise with *Seeds* that are of the Weakest Sort, and have least Vigour. You shall doe well therefore, to take *Marsh-Herbs*, and Plant them upon Tops of Hills, and Champaignes; And such *Plants* as require much Moisture, upon Sandie and very drie Grounds. As for Example, *Marsh-Mallowes*, and *Sedge*, upon Hills; *Cucumber* and *Lettuce-Seeds*, and *Colewortes*, upon a *Sandy Plot*: So contrariwise plant *Bushes*, *Heath*, *Ling*, & *Brakes*, upon a *Wet* or *Marsh Ground*. This I conceive also, that all *Esculent* and *Garden-Herbs*, set upon the Tops of Hills, will prove more *Medicinall*, though lesse *Esculent*, than they were before. And it may be likewise, some *Wilde Herbs* you may make *Sallet-Herbs*. This is the first Rule for *Transmutation* of *Plants*.

527 The second Rule shall bee to bury some few *Seeds*, of the *Herb* you would change, amongst other *Seeds*; And then you shall see, whether the Juyce of those other *Seeds*, doe not so qualifie the Earth, as it will alter the *Seed*, whereupon you worke. As for Example; Put *Parsly-Seed* amongst *Onion-Seed*; Or *Lettuce-Seed* amongst *Parsley-Seed*; Or *Basill-Seed* amongst *Thyme-Seed*; And see the Change of Taste, or otherwise. But you shall doe well, to put the *Seed* you would change, into a little linnen Cloth, that it
528 mingle not with the forraine *Seed*.

The third Rule shall be, the *Making* of some *Medley* or *Mixture* of *Earth*, with some other *Plants Bruised*, or *Shaven*, either in *Leafe* or *Root*: As for Example, make *Earth* with a *Mixture* of *Colewort--Leaves* stamped, and set in it *Artichoakes*, or *Parsnips*; So take *Earth* made with *Marjoram*, or *Origanum*, or *Wilde-Thyme*, bruised, or stamped, and set in it *Fennell-Seed*, &c. In which Operation, the Processe of Nature still will be, (as I conceive,) not that the *Herbe* you worke upon, should draw the Juyce of the Forrain *Herbe*; (For that Opinion we have formerly rejected;) But that there will bee a New Confection of Mould, which perhaps will alter the *Seed*, and yet not to the
529 kinde of the former *Herbe*.

The fourth Rule shall be, to marke what *Herbs*, *some Earths doe put forth of themselves*; And to take that *Earth*, and to *Pot* it, or to *Vessell* it; And in that to set the *Seed* you would change: As for Example, take from under Walls, or the like, where *Nettles* put forth in abundance, the Earth which you shall there finde, without any *String*, or *Root* of the *Nettles*; And Pot that *Earth*, and set in it *Stock-gilly-flowers*, or *Wall-Flowers*, &c. Or sow in the *Seeds* of them; And see what the Event will bee: Or take *Earth*, that you have prepared to put forth *Mushromes*, of it selfe, (whereof you shall finde some *Instances* following;) And sow in it *Purslane-Seed*, or *Lettuce-Seed*; for in these *Experiments*, it is likely enough, that the *Earth* being accustomed to send forth one Kinde of Nourishment, will alter the new *Seed*.

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The fifth Rule shall be, to make the *Herbe grow Contrary to his Nature*; As to make *Ground-Herbs* rise in *Heighth*: As for example; Carry *Camomill*, or *Wilde-Thyme*, or the *Greene-Strawberry*, upon Sticks, as you doe *Hops* upon Poles; And see what the Event will be. 530

The sixth Rule shall be, to make *Plants grow out of the Sunne, or open Aire*; For that is a great Mutation in Nature; And may induce a Change in the *Seed*: As barrell up *Earth*, and sow some *Seed* in it, and put in the Bottome of a Pond; Or put it in some great hollow *Tree*; Trie also the Sowing of *Seeds*, in the Bottomes of Caves; And Pots with *Seeds* sowne, hanged up in Wells, some distance from the Water, and see what the Event will be. 531

Experiments in Consort, touching the *Procerity*, and *Lownesse*, and *Artificiall dwarfing* of *Trees*.

IT is certaine, that *Timber-Trees* in *Coppice-Woods*, grow more upright, and more free from Under-Boughs, than those that stand in the *Field*: The *Cause* whereof is, for that *Plants* have a Naturall Motion, to get to the Sunne; And besides, they are not glutted with too much Nourishment; For that the *Coppice* shareth with them; And Repletion ever hindereth Stature; Lastly, they are kept warme; And that ever in *Plants* helpeth Mounting. 532

Trees, that are, of themselves, full of *Heat*, (which *Heat* appeareth by their *Inflammable Gums*,) as *Firrs*, and *Pines*, mount of themselves in Heighth without Side-Boughs, till they come towards the Top. The *Cause* is, partly Heat; And partly Tenuity of Juyce; Both which send the Sap upwards. As for *Iuniper*, it is but a *Shrub*, and groweth not bigge enough in Body, to maintaine a tall *Tree*. 533

It is reported, that a Good Strong *Canvas*, spread over a *Tree* grafted low, soone after it putteth forth, will *dwarfe* it, and make it spread. The *Cause* is plaine; For that all Things that grow, will grow as they finde Roome. 534

Trees are generally set of *Roots*, or *Kernells*; But if you set them of *Slips*, (as of some *Trees* you may, by name the *Mulberry*,) some of the *Slips* will take; And those that take, (as is reported,) will be *Dwarfe-Trees*. The *Cause* is, for that a *Slip* draweth Nourishment more weakly, than either a *Root*, or *Kernell*. 535

All *Plants* that put forth their *Sap* hastily, have their Bodies not proportionable to their Length; And therefore they are *Winders*, and *Creepers*; As *Ivy*, *Briony*, *Hops*, *Woodbine*: Whereas *Dwarfing* requireth a slow Putting forth, and lesse Vigour of Mounting. 536

Experiments in Consort, touching the Rudiments of *Plants*, and of the Excrescences of *Plants*, or *Super-Plants*.

The *Scripture* saith, that *Salomon* wrote a *Naturall History*: from the *Cedar* of *Libanus*, to the *Mosse growing upon the Wall*: For so the best *Translations* have it. And it is true that *Mosse* is but the *Rudiment* of a *Plant*; And (as it were) the *Mould* of *Earth*, or *Barke*. 537

Mosse groweth chiefly upon *Ridges* of *Houses*, tiled or thatched; And upon the *Crests* of *Walls*. And that *Mosse* is of a lightsome, and pleasant Green. The Growing upon *Slopes* is caused, for that *Mosse*, as on the one side it commeth of Moisture and water, so on the other side the *Water* must but Slide, and not stand or Poole. And the *Growing* upon *Tiles*, or *walls*, &c. is caused, for that those dried Earths, having not Moisture sufficient to put forth a *Plant*, doe practise *Germination* by Putting forth *Mosse*; Though when by Age, or otherwise, they grow to relent and resolve, they sometimes

ſometimes put forth *Plants*; As *Wall-Flowers*. And almoſt all *Moſſe* hath here and there little Stalkes, beſides the low Thrumme.

538 *Moſſe* groweth upon *Alleyes*, eſpecially ſuch as lie Cold, and upon the North; As in divers Tarraſſes: And againe, if they be much trodden; Or if they were at the firſt, gravelled; For wherefoever *Plants* are kept downe, the Earth putteth forth *Moſſe*.

539 *Old Ground*, that hath been long unbroken up, gathereth *Moſſe*: And therefore Husbandmen uſe to cure their *Paſture Grounds*, when they grow to *Moſſe*, by Tilling them for a yeare, or two: Which alſo dependeth upon the ſame *Cauſe*; For that the more Sparing and Starving Juyce of the Earth, inſufficient for *Plants*, doth breed *Moſſe*.

540 *Old Trees* are more *Moſſie*, (farre) than *Young*; For that the Sap is not ſo franke as to riſe all to the Boughes, but tyreth by the Way, and putteth out *Moſſe*.

541 *Fountaines* have *Moſſe* growing upon the *Ground* about them;

Muſcoſi Fontes; ———————

The *Cauſe* is, for that the *Fountaines* draine the *Water* from the *Ground Adjacent*, and leave but ſufficient Moiſture to breed *Moſſe*: And beſides, the *Coldneſſe* of the *Water* conduceth to the ſame.

542 The *Moſſe* of *Trees*, is a kinde of *Haire*; For it is the Juyce of the *Tree*, that is Excerned, and doth not Aſſimilate. And upon great *Trees* the *Moſſe* gathereth a Figure, like a *Leafe*.

543 The *Moiſter Sort* of *Trees* yeeld little *Moſſe*; As we ſee in *Aſps*, *Poplars*, *Willows*, *Beeches*, &c. Which is partly cauſed for the Reaſon that hath been given, of the francke Putting up of the *Sap* into the *Boughes*; And partly, for that the *Barks* of thoſe *Trees*, are more Cloſe, and Smooth, than thoſe of *Oakes*, and *Aſhes*; Whereby the *Moſſe* can the hardlier iſſue out.

544 In *Clay-Grounds*, all *Fruit-Trees* grow full of *Moſſe*, both upon *Body* and *Boughes*; Which is cauſed, partly by the *Coldneſſe* of the *Ground*, whereby the *Plants* nouriſh leſſe; And partly by the *Toughneſſe* of the *Earth*, whereby the *Sap* is ſhut in, and cannot get up, to ſpread ſo franckly, as it ſhould doe.

545 We have ſaid heretofore, that if *Trees* be *Hide-bound*, they wax leſſe Fruitfull, and gather *Moſſe*: And that they are holpen by *Hacking*, &c. And therefore by the Reaſon of Contraries, if *Trees* bee bound in with *Cords*, or ſome Outward *Bands*, they will put forth more *Moſſe*: Which (I thinke) happeneth to *Trees* that ſtand Bleake, and upon the Cold Winds. It would alſo be tried, whether, if you cover a *Tree*, ſomewhat thick upon the top, after his Powling, it will not gather more *Moſſe*. I thinke alſo, the *Watring* of *Trees* with *Cold Fountaine-Water*, will make them grow full of *Moſſe*.

546 There is a *Moſſe* the *Perfumers* have, which commeth out of *Apple-Trees*, that hath an Excellent Sent. *Quære* particularly for the *Manner* of the *Growth*, and the *Nature* of it. And for this *Experiments* ſake, being a Thing of Price, I have ſet down the laſt *Experiments*, how to multiply, and call on *Moſſes*.

Next unto *Moſſe*, I will ſpeake of *Muſhromes*; Which are likewiſe an *Vnperfect Plant*. The *Muſhromes* have two ſtrange *Properties*; The One, that they yeeld ſo *Delicious* a *Meat*; The other, that they *come up* ſo *haſtily*; As in a *Night*; And yet they are *Vnſowne*. And therefore ſuch as are Upſtarts in State, they call

call, in reproach, *Mushromes*. It must needs bee therefore, that they be made of much *Moysture*; And that *Moisture* Fat, Grosse, and yet somwhat Concocted. And (indeed) wee finde, that *Mushromes* cause the *Accident*, which wee call *Incubus*, or the *Mare*, in the *Stomacke*. And therefore the *Surfeit* of them may Suffocate, and Empoyson. And this sheweth, that they are Windy; And that Windinesse is Grosse, and Swelling; Not Sharp, or Griping. And upon the same reason *Mushromes* are a venereous Meat.

It is reported, that the *Barke* of *White*, or *Red Poplar*, (which are of the Moistest of *Trees*,) cut small, and cast into *Furrowes* well dunged, will cause the Ground to put forth *Mushromes*, at all *Seasons* of the *Yeare*, fit to be eaten. Some adde to the Mixture *Leaven* of *Bread*, resolved in *Water*. 547

It is reported, that if a *Hilly-Field*, where the *Stubble* is standing, be set on *Fire*, in the *Showry Season*, it will put forth great Store of *Mushromes*. 548

It is reported, that *Harts-Horne*, *Shaven*, or in *Small Peeces*, mixed with *Dung*, and *watred*, putteth up *Mushromes*. And we know that *Harts-Horne* is of a Fat and Clammie Substance: And it may bee *Oxe-Horne* would doe the like. 549

It hath beene reported, though it be scarce credible, that *Ivy* hath growne out of a *Stags-Horne*; which they suppose did rather come from a *Confrication* of the *Horne* upon the *Ivy*, than from the *Horne* it selfe. There is not knowne any Substance, but *Earth*, and the *Precedures* of *Earth*, (as *Tile*, *Stene*, &c.) that yeeldeth any *Mosse*, or *Herby Substance*. There may bee Triall made of some *Seeds*, as that *Fennell-Seed*, *Mustard-Seed*, and *Rape-Seed*, put into some little *Holes*, made in the *Hornes* of *Stags*, or *Oxen*, to see if they will grow. 550

There is also another *Vnperfect Plant*, that (in shew) is like a great *Mushrome*: And it is sometimes as broad as ones Hat; Which they call a *Toads-Stoole*: But it is not Esculent; And it groweth (commonly) by a dead Stub of a *Tree*; And likewise about the *Roots* of *Rotten-Trees*: And therefore seemeth to take his Juyce from *Wood Putrified*. Which sheweth, by the way, that *Wood Putrified* yeeldeth a franke *Moisture*. 551

There is a *Cake* that groweth upon the Side of a *Dead Tree*, that hath gotten no Name, but it is large, and of a Chesnut Colour, and hard, and pithy; Whereby it should seeme, that even *Dead Trees* forget not their Putting forth; No more than the *Carcasses* of *Mens Bodies* that put forth *Haire*, and *Nailes*, for a Time. 552

There is a *Cod*, or *Bag*, that groweth commonly in the *Fields*; That at the first is hard like a *Tennis-Ball*, and white; And after groweth of a *Mushrome Colour*, and full of light *Dust* upon the Breaking: And is thought to be dangerous for the *Eyes*, if the *Powder* get into them; And to be good for *Kibes*. Belike it hath a *Corrosive*, and *Fretting Nature*. 553

There is an *Herb* called *Iewes-Eare*, that groweth upon the *Roots*, and *Lower Parts* of the *Bodies* of *Trees*; Especially of *Elders*, and sometimes *Ashes*. It hath a strange Propertie; For in *Warme Water*, it swelleth, and openeth extremely. It is not greene, but of a duskie browne Colour. And it is used for *Squinancies*, and *Inflammations* in the *Throat*; Whereby it seemeth to have a Mollifying, and Lenifying Vertue. 554

There

555 There is a Kinde of *Spongie Excrescence*, which groweth chiefly upon the *Roots* of the *Laser-Tree*; And sometimes upon *Cedar*, and other *Trees*. It is very White, and Light, and Friable: Which we call *Agarick*. It is famous in *Physick* for the *Purging* of *Tough flegme*. And it is also an excellent *Opener* for the *Liver*: But Offensive to the *Stomacke*; And in *Taste* it is, at the first, *Sweet*, and after *Bitter*.

556 We finde no *Super-Plant*, that is a Formed *Plant*, but *Messeltoe*. They have an idle Tradition, that there is a *Bird*, called a *Missel-Bird*, that feedeth upon a *Seed*, which many times shee cannot disgest, and so expelleth it whole with her Excrement: which falling upon a *Bow* of a *Tree*, that hath some Rift, putteth forth the *Missseltoe*. But this is a Fable; For it is not probable, that *Birds* should feed upon that they cannot disgest. But allow that, yet it cannot be for other Reasons: For First, it is found but upon certain *Trees*; And those *Trees* beare no such *Fruit*, as may allure that *Bird* to sit, and feed upon them. It may be, that *Bird* feedeth upon the *Missseltoe-Berries*, and so is often found there; Which may have given occasion to the Tale. But that which maketh an End of the Question, is, that *Missseltoe* hath been found to put forth under the *Boughes*, and not (onely) above the *Boughes*: So it cannot be any Thing that falleth upon the *Bough*. *Missseltoe* groweth chiefly upon *Crab-Trees*, *Apple-Trees*, sometimes upon *Hasles*; And rarely upon *Oakes*; The *Missseltoe* whereof is counted very *Medicinall*. It is ever greene, Winter and Summer; And beareth a *White Glistering Berry*: And it is a *Plant*, utterly differing from the *Plant*, upon which it groweth. Two things therefore may be certainly set downe: First, that *Super-fætation* must be by *Abundance* of *Sap*, in the *Bough* that putteth it forth: Secondly, that that *Sap* must be such, as the *Tree* doth excerne, and cannot assimilate; For else it would goe into a *Bough*; And besides, it seemeth to be more Fat and Unctuous, than the Ordinary *Sap* of the *Tree*; Both by the *Berry*, which is Clammie; And by that it continueth greene, Winter and Summer, which the *Tree* doth not.

557 This *Experiment* of *Missseltoe* may give Light to other Practices. Therefore Triall would be made, by Ripping of the *Bough* of a *Crab-Tree*, in the *Barke*; And *Watring* of the Wound every Day, with *Warme-Water Dunged*, to see if it would bring forth *Missseltoe*, or any such like Thing. But it were yet more likely to trie it, with some other *Watring* or *Anointing*, that were not so Naturall to the *Tree*, as *Water* is; As *Oyle*, or *Barme* of *Drinke*, &c. So they be such Things as kill not the *Bough*.

558 It were good to trie, what *Plants* would put forth, if they bee forbidden to put forth their *Naturall Boughes*: Poll therefore a *Tree*, and cover it, some thicknesse, with *Clay* on the Top; And see what it will put forth. I suppose it will put forth *Roots*; For so will a *Cions*, being turned downe into *Clay*: Therefore, in this *Experiment* also, the *Tree* would bee closed with somewhat, that is not so Naturall to the *Plant*, as *Clay* is. Trie it with *Leather*, or *Cloth*, or *Painting*, so it be not hurtfull to the *Tree*. And it is certaine, that a *Brake* hath beene knowne to grow out of a *Pollard*.

559 A Man may count the *Prickles* of *Trees* to be a kinde of *Excrescence*; For they will never be *Boughes*, nor beare *Leaves*. The *Plants* that have *Prickles*, are *Thornes*, blacke and white; *Brier*; *Rose*; *Limon-Trees*; *Crab-Trees*; *Goose-Berry*; *Berbery*; These have it in the *Bough*; The *Plants* that have *Prickles* in the *Leafe*, are; *Holly*; *Iuniper*; *Whin-bush*; *Thistle*; *Nettles* also have a small Venomous *Prickle*; So hath *Borrage*, but harmelesse. The *Cause* must be *Hastie Putting forth*; *Want* of *Moisture*; And the *Closenesse* of the *Barke*; For the

the *Haste* of the *Spirit to put forth*, and the *Want* of *Nourishment* to put forth a *Bough*, and the *Closenesse* of the *Barke*, cause *Prickles* in *Boughes*; And therefore they are ever like a *Pyramis*, for that the *Moisture* spendeth after a little Putting forth. And for *Prickles* in *Leaves*, they come also of *Putting forth more Iuyce* into the *Leafe*, than can spread in the *Leafe* smooth; and therefore the *Leaves* otherwise are *Rough*, as *Borrage* and *Nettles* are. As for the *Leaves* of *Holly*, they are *Smooth*, but never *Plaine*, but as it were with *Folds*, for the same *Cause*.

There be also *Plants*, that though they have no *Prickles*, yet they have a 560
a Kinde of *Downey* or *Velvet Rine*, upon their *Leaves*; As *Rose-Campion*, *Stock-Gilly-Flowers*, *Colts-Foot*; which *Downe* or *Nap* commeth of a *Subtill Spirit*, in a *Soft* or *Fat Substance*. For it is certaine, that both *Stock-Gilly-Flowers*, and *Rose-Campions*, stamped, have been applyed, (with successe,) to the *Wrests* of those that have had *Tertian*, or *Quartan Agues*; And the *Vapour* of *Colts-Foot* hath a Sanative vertue, towards the *Lungs*; And the *Leafe* also is *Healing* in *Surgery*.

Another Kinde of *Excrescence* is an *Exudation* of *Plants*, joyned with *Putrefaction*; As wee see in *Oake-Apples*, which are found chiefly upon the 561
Leaves of *Oakes*; And the like upon *Willowes*: And Countrey People have a kind of *Prediction*, that if the *Oake-Apple*, broken, be full of *Wormes*, it is a Signe of a *Pestilent Yeare*; Which is a likely Thing, because they grow of Corruption.

There is also upon *Sweet*, or other *Brier*, a fine *Tuft*, or *Brush* of *Mosse*, of 562
divers Colours; Which if you cut, you shall ever finde full of little white *Wormes*.

Experiments in Consort, touching the *Producing* of *Perfect Plants* without *Seed*.

IT is certaine, that *Earth* taken out of the *Foundations* of *Vaults* and *Houses*, and *Bottomes* of *Wells*, and then put into *Pots*, will put forth Sundry Kinds of *Herbs*: But some *Time* is required, for the *Germination*; For if it bee taken, but from a *Fathome* deep, it will put forth the *First Yeare*; If much deeper, not till after a *Yeare*, or *Two*. 563

The *Nature* of the *Plants* growing out of *Earth* so taken up, doth follow the *Nature* of the *Mould* it selfe; As if the *Mould* bee *Soft*, and Fine, it putteth forth Soft *Herbs*; As *Grasse*, *Plantine*, and the like; If the *Earth* bee Harder and Coarser, it putteth forth *Herbs* more *Rough*, as *Thistles*, *Firres*, &c. 564

It is Common *Experience*, that where *Alleyes* are close *Gravelled*, the *Earth* putteth forth, the first yeare, *Knot-Grasse*, and after *Spire-Grasse*. The *Cause* is, for that the *Hard Gravell*, or *Pebble* at the first Laying, will not suffer the *Grasse* to come forth upright, but turneth it to finde his way where it can; But after that the *Earth* is somewhat loosened at the Top, the Ordinary *Grasse* commeth up. 565

It is reported, that *Earth*, being taken out of *Shady* and *Watry Woods*, some depth, and Potted, will put forth *Herbs* of a Fat and Juicie Substance; As *Penny-wort*, *Purslane*, *Housleeke*, *Penny-royall*, &c. 566

The *Water* also doth send forth *Plants*, that have no *Roots* fixed in the Bottome; But they are lesse *Perfect Plants*, being almost but *Leaves*, and those Small ones: Such is that we call *Duck-Weed*; Which hath a *Leafe* no bigger than a *Thyme-Leafe*, but of a fresher Greene, and putteth forth a little *String* into the *Water*, farre from the *Bottome*. As for the *Water-Lilly*, it hath a *Root* in the *Ground*: And so have a Number of other *Herbs* that grow in *Ponds*. 567

It

568 It is reported by some of the *Ancients*, and some *Moderne-Testimonie* likewise, that there be some *Plants*, that grow upon the Top of the *Sea*; Being supposed to grow of some *Concretion* of *Slime* from the *Water*, where the *Sunne* beateth hot, and where the *Sea* stirreth little. As for *Alga Marina*, (*Sea-weed*,) and *Eryngium* (*Sea-Thistle*,) both have *Roots*; but the *Sea-weed* under the *Water*, the *Sea-Thistle* but upon the *Shore*.

569 The *Ancients* have noted, that there are some *Herbs*, that grow out of *Snow*, laid up close together, and *Putrified*; And that they are all *Bitter*; And they name one especially, *Flomus*, which we call *Moth-Mullein*. It is certain, that *Wormes* are found in *Snow* commonly, like *Earth-Wormes*; And therefore it is not unlike, that it may likewise put forth *Plants*.

570 The *Ancients* have affirmed, that there are some *Herbs*, that grow out of *Stone*; Which may be, for that it is certaine, that *Toads* have beene found in the Middle of a Free-Stone. We see also, that *Flints*, lying above *Ground*, gather *Mosse*; And *Wall-Flowers*, and some other *Flowers*, grow upon *Walls*; But whether upon the Maine *Bricke*, or *Stone*, or whether out of the *Lime*, or *Chincks*, is not well observed; For *Elders* and *Ashes* have beene seene to grow out of *Steeples*: But they manifestly grow out of *Clefts*; In so much as when they grow bigge, they will dis-joyne the *Stone*. And besides, it is doubtfull, whether the *Mortar* it selfe putteth it forth, or whether some *Seeds* be not let fall by *Birds*. There be likewise *Rock-Herbs*; But I suppose those are, where there is some *Mould* or *Earth*. It hath likewise been found, that great *Trees* growing upon *Quarries*, have put downe their *Roots* into the *Stone*.

571 In some *Mines* in *Germany*, as is reported, there grow in the Bottome *Vegetables*; And the *Worke-Folks* use to say, they have *Magicall Vertue*; And will not suffer men to gather them.

572 The *Sea-Sands* seldome beare *Plants*. Whereof the *Cause* is yeelded, by some of the *Ancients*, for that the *Sunne* exhaleth the *Moisture*, before it can incorporate with the *Earth*, and yeeld a *Nourishment* for the *Plant*. And it is affirmed also, that Sand hath (alwayes) his *Root* in *Clay*; And that there be no Veines of *Sand*, any great depth within the *Earth*.

573 It is certaine, that some *Plants* put forth for a time, of their owne *Store*, without any *Nourishment* from *Earth*, *Water*, *Stone*, &c. Of which *Vide* the *Experiment* 29.

Experiments in Consort, touching *Forraine Plants*.

IT is reported, that *Earth*, that was brought out of the *Indies*, and other *Remote Countries*, for *Ballast* of *Ships*, cast upon some *Grounds* in *Italy*, did put forth *Forraine Herbs*, to us in *Europe* not knowne; And, that which is more, that of their *Roots*, *Barks*, and *Seeds*, contused together, and mingled with other *Earth*, and well Watred with *Warme Water*, there came forth *Herbs*, much like the Other.

574

575 *Plants* brought out of *Hot Countries*, will endeavour to put forth, at the same *Time*, that they usually doe in their owne *Climate*; And therefore to preserve them, there is no more required, than to keep them from the Injury of Putting back by *Cold*. It is reported also, that *Graine* out of the *Hotter Countries* translated into the *Colder*, will be more forward, than the Ordinary *Graine* of the *Cold Countrey*. It is likely, that this will prove better in *Graines*, than in *Trees*; For that *Graines* are but *Annuall*; And so the *Vertue* of the *Seed* is not worne out; Whereas in a *Tree*, it is embased by the *Ground*, to which it is Removed.

576 Many *Plants*, which grow in the *Hotter Countries*, being set in the *Colder*,

der, will nevertheleſſe, even in thoſe *Cold Countries*, being ſowne of *Seeds* late in the *Spring*, come up and abide moſt part of the *Summer*; As wee finde it in *Orenge*, and *Limon-Seeds*, &c. The *Seeds* whereof ſowne in the End of *April*, will bring forth excellent *Sallets*, mingled with other *Herbs*. And I doubt not, but the *Seeds* of *Clove-Trees*, and *Pepper-Seeds*, &c. if they could come hither *Greene* enough to be ſowen, would doe the like.

Experiments in Conſort; touching the *Seaſons* in which *Plants* come forth.

THere be ſome *Flowers*, *Bloſſomes*, *Graines*, and *Fruits*, which come more *Early*; And others which come more *Late* in the Yeare. The *Flowers* that come early, with us, are; *Prime-Roſes*, *Violets*, *Anemonies*, *Water-Daffadillies*, *Crocus Vernus*, and ſome early *Tulippa's*. And they are all *Cold Plants*; Which therefore, (as it ſhould ſeeme,) have a quicker *Perception* of the *Heat* of the *Sunne* Increaſing, than the *Hot Herbs* have; As a *Cold Hand* will ſooner finde a little *Warmth*, than a *Hot*. And thoſe that come next after, are *Wall-Flowers*, *Cowſlips*, *Hyacinths*, *Roſemary-Flowers*, &c. And after them, *Pincks*, *Roſes*, *Flowerdeluces*, &c. and the lateſt are *Gilly-Flowers*, *Holly-Oakes*, *Larkes-Foot*, &c. The Earlieſt *Bloſſomes* are, the *Bloſſomes* of *Peaches*, *Almonds*, *Cornelians*, *Mezerions*, &c. And they are of ſuch *Trees*; as have much *Moiſture*, either *Watry*, or *Oily*. And therefore *Crocus Vernus* alſo, being an *Herbe*, that hath an *Oylie Iuyce*, putteth forth early. For thoſe alſo finde the *Sunne* ſooner than the *Drier Trees*. The *Graines* are, firſt *Rie* and *Wheat*; Then *Oats* and *Barley*; Then *Peaſe* and *Beanes*. For though Greene *Peaſe* and *Beanes* be eaten ſooner, yet the Drie Ones, that are uſed for *Horſe-Meat*, are ripe laſt; And it ſeemeth that the Fatter *Graine* commeth firſt. The Earlieſt *Fruits* are, *Strawberries*, *Cherries*, *Gooſeberries*, *Corrans*; And after them *Early Apples*, *Early Peares*, *Apricots*, *Raſps*; And after them, *Damaſins*, and moſt Kinde of *Plums*, *Peaches*, &c. And the lateſt are *Apples*, *Wardens*, *Grapes*, *Nuts*, *Quinces*, *Almonds*, *Sloes*, *Brier-berries*, *Heps*, *Medlars*, *Services*, *Cornelians*, &c. 577

It is to be noted, that (commonly) *Trees* that *ripen lateſt*, *Bloſſome ſooneſt*: As *Peaches*, *Cornelians*, *Sloes*, *Almonds*, &c. And it ſeemeth to be a Worke of Providence, that they bloſſome ſo ſoone; For otherwiſe, they could not have the *Sunne* long enough to ripen. 578

There be Fruits, (but rarely, that come *twice* a *Yeare*; as ſome *Peares*, *Strawberries*, &c. And it ſeemeth they are ſuch as abound with Nouriſhment; Whereby after one Period, before the *Sunne* waxeth too weake, they can endure another. The *Violet* alſo, amongſt *Flowers*, commeth twice a Yeare; Eſpecially the *Double White*; And that alſo is a *Plant* full of Moiſture. *Roſes* come twice, but it is not without *Cutting*, as hath beene formerly ſaid. 579

In *Muſcovia*, though the *Corne* come not up, till late *Spring*, yet their *Harveſt* is as Early as Ours. The *Cauſe* is, for that the *Strength* of the *Ground* is kept in with the *Snow*; And wee ſee with us, that if it be a long *Winter*, it is commonly a more *Plentifull Yeare*: And after thoſe kinde of *Winters* likewiſe, the *Flowers*, and *Corne*, which are Earlier, and Later, doe come commonly at once, and at the ſame time; Which troubleth the *Husbandman* many times; For you ſhall have *Red-Roſes*, and *Damaſke Roſes*, come together; And likewiſe the *Harveſt* of *Wheat* and *Barley*. But this happeneth ever, for that the Earlier ſtayeth for the Later; And not that the Later commeth ſooner. 580

There be divers *Fruit-Trees*, in the *Hot Countries*, which have *Bloſſomes*, and *Young Fruit*, and *Ripe Fruit*, almoſt all the Yeare, ſucceeding one another. And it is ſaid, the *Orenge* hath the like with us, for a great Part of Summer; 581

Summer; And so also hath the *Figge*. And no doubt, the *Naturall Motion* of *Plants*, is to have so; But that either they want *Iuyce* to spend; Or they meet with the *Cold* of the Winter: And therefore this *Circle* of *Ripening* cannot be, but in *Succulent Plants*, and *Hot Countries*.

582 Some *Herbs* are but *Annuall*, and die, *Root* and all, once a Yeare; As *Borrage*, *Lettuce*, *Cucumbers*, *Muske-Melons*, *Basill*, *Tobacco*, *Mustard-Seed*, and all kindes of *Corne*; Some continue many Yeares; As *Hyssope*, *Germander*, *Lavender*, *Fennell*, &c. The *Cause* of the *Dying* is *double*; The first is the *Tendernesse* and *Weaknesse* of the *Seed*, which maketh the Period in a small time; As it is in *Borrage*, *Lettuce*, *Cucumbers*, *Corne*, &c. And therefore none of these are Hot. The other *Cause* is, for that some *Herbs* can worse endure *Cold*; As *Basill*, *Tobacco*, *Mustard-Seed*. And these have (all) much *Heat*.

Experiments in Consort, touching the *Lasting* of *Herbs* and *Trees*.

THe *Lasting* of *Plants* is most in those that are *Largest* of *Body*; As *Oaks*, *Elme*, *Chest-Nut*, the *Boat-Tree*, &c. And this holdeth in *Trees*; But in *Herbs* it is often contrary; For *Borage*, *Colewort*, *Pompions*, which are *Herbs* of the *Largest Size*, are of small Durance; Whereas *Hyssope*, *Winter-Savory*, *Germander*, *Thyme*, *Sage*, will last long. The *Cause* is, for that *Trees* last according to the *Strength*, and *Quantity* of their *Sap* and *Iuyce*; Being well munited by their *Barke* against the Injuries of the *Aire*: But *Herbs* draw a Weak *Iuyce*; And have a soft *Stalke*; And therefore those amongst them which last longest, are *Herbs* of *Strong Smell*, and with a *Stickie Stalke*.

583 584 *Trees* that beare *Mast*, and *Nuts*, are commonly more lasting, than those that beare *Fruits*; Especially the *Moister Fruits*: As *Oakes*, *Beeches*, *Chesnuts*, *Wall-nuts*, *Almonds*, *Pine-Trees*, &c. last longer than *Apples*, *Peares*, *Plums*, &c. The *Cause* is the *Fatnesse* and *Oylinesse* of the *Sap*; Which ever wasteth lesse, than the more *Watry*.

585 *Trees*, that bring forth their *Leaves* late in the *Yeare*, and cast them likewise late, are more *lasting*, than those that sprout their Leaves Early, or shed them betimes. The *Cause* is, for that the late *Comming forth* sheweth a *Moisture* more fixed; And the other more loose, and more easily resolved. And the same *Cause* is, that *Wilde-Trees* last longer than *Garden-Trees*; And in the same kinde, those whose *Fruit* is Acide, more than those whose *Fruit* is sweet.

586 Nothing procureth the *Lasting* of *Trees*, *Bushes*, and *Herbs*, so much, as often *Cutting*: For every *Cutting* causeth a Renovation of the *Iuyce* of the *Plant*; That it neither goeth so farre, nor riseth so faintly, as when the *Plant* is not *Cut*: Insomuch as *Annuall Plants*, if you cut them seasonably, and will spare the use of them, and suffer them to come up still young, will last more Yeares than one; As hath beene partly touched; Such as is *Lettuce*, *Purslane*, *Cucumber*, and the like. And for *Great Trees*, we see almost all *Overgrowne-Trees*, in Church-yards, or neare Ancient Buildings, and the like, are *Pollards*, or *Dottards*, and not *Trees* at their full Height.

587 Some *Experiment* would be made, how by *Art* to make *Plants* more *Lasting*, than their ordinary Period; As to make a *Stalke* of *Wheate*, &c. last a whole yeare. You must ever presuppose, that you handle it so, as the *Winter* killeth it not; For we speake onely of *Prolonging* the *Naturall Period*. I conceive, that the *Rule* will hold; That whatsoever maketh the *Herbe* come later, than at his time, will make it last longer time: It were good to trie it, in a *Stalke* of *Wheat*, &c. set in the Shade, and encompassed with a Case of *Wood*, not touching the *Straw*, to keep out open *Aire*.

As for the Preservation *of* Fruits, *and* Plants, *as well upon the* Tree, *or* Stalk,

as

as gathered, we shall handle it under the Title *of* Conservation *of* Bodies.

THe *Particular Figures* of *Plants* we leave to their *Descriptions*; But some few Things, in generall, we will observe. *Trees* and *Herbs*, in the Growing forth of their *Boughs*, and *Branches*, are not *Figured*, and keepe no Order. The *Cause* is, for that the *Sap*, being restrained in the *Rinde*, and *Barke*, breaketh not forth at all; (As in the Bodies of *Trees*, and *Stalkes* of *Herbs*, till they begin to branch; And then, when they make an Eruption, they breake forth casually, where they finde best way, in the *Barke*, or *Rinde*. It is true, that some *Trees* are more scattered in their *Boughes*; As *Sallow-Trees*, *Warden-Trees*, *Quince-Trees*, *Medlar-Trees*, *Limon-Trees*, &c. Some are more in the forme of a *Pyramis*, and come almost to todd; As the *Peare-Tree*, (which the *Criticks* will have to borrow his name of πῦρ, *Fire*,) *Orenge-Trees*, *Firre-Trees*, *Service-Trees*, *Lime-Trees*, &c. And some are more spred and broad; As *Beeches*, *Horneheame*, &c. The rest are more indifferent. The *Cause* of Scattering the *Boughes*, is the Hasty breaking forth of the *Sap*; And therefore those *Trees* rise not in a *Body* of any Height, but branch neare the *Ground*. The *Cause* of the *Pyramis*, is the Keeping in of the *Sap*; long before it branch; And the spending of it when it beginneth to branch, by equall degrees. The *Spreading* is caused by the *Carrying* up of the *Sap*, plentifully, without Expence; And then putting it forth speedily, and at once. Experiments in Consort, touching the severall *Figures* of *Plants*. 588

There be divers *Herbs*, but no *Trees*, that may be said to have some kinde of Order, in the Putting forth of their *Leaves*: For they have *Joynts*, or *Knuckles*, as it were Stops in their *Germination*; As have *Gilly-Flowers*, *Pinks*, *Fennell*, *Corne*, *Reeds*, and *Canes*. The *Cause* wherof is, for that the *Sap* ascendeth unequally, and doth (as it were) tire and stop by the way. And it seemeth, they have some *Closenesse*, and *Hardnesse* in their *Stalke*, which hindreth the *Sap* from going up, untill it hath gathered into a Knot, and so is more urged to put forth. And therefore, they are most of them hollow, when the *Stalke* is drie. As *Fennell-Stalke*, *Stubble*, and *Canes*. 589

Flowers have (all) exquisite *Figures*; And the *Flower-Numbers* are (chiefly) *Five*, and *Foure*; As in *Prime-Roses*, *Bryer-Roses*, *Single Musk-Roses*, *Single-Pinks*, and *Gilly-Flowers*, &c. which have five *Leaves*: *Lillies*, *Flower-de-luces*, *Borage*, *Bugloss*, &c. which have foure Leaves. But some put forth *Leaves* not Numbred; But they are ever small Ones; As *Mary-Golds*, *Trifoile*, &c. Wee see also, that the *Sockets*, and *Supporters* of *Flowers*, are *Figured*; As in the Five *Brethren* of the *Rose*; *Sockets* of *Gilly-Flowers*; &c. *Leaves* also are all *Figured*; Some Round; Some long; None Square; And many jagged on the Sides; Which *Leaves* of *Flowers* seldome are. For I account the *Jagging* of *Pincks*, and *Gilly-Flowers*, to be like the inequalitie of *Oak-Leaves*, or *Vine-Leaves*, or the like; But they seldome or never have any small *Purles*. 590

OF *Plants*, some few put forth their *Blossomes* before their *Leaves*; As *Almonds*, *Peaches*, *Cornelians*, *Black-Thorne*, &c. But most put forth some *Leaves* before their *Blossomes*; As *Apples*, *Pears*, *Plums*, *Cherries*, *White-Thorn*, &c. The *Cause* is, for that those, that put forth their *Blossomes* first, have either an Acute and *Sharp Spirit*; (And therefore commonly they all put forth early in the Spring, and ripen very late; As most of the Particulars before mentioned;) Or else an *Oylie Iuyce*, which is apter to put out *Flowers*, than *Leaves*. Experiments in Consort, touching some *Principall Differences* in *Plants*. 591

Of *Plants*, some are *Greene* all *Winter*; Others cast their *Leaves*. There are *Greene* all *Winter*; *Holly*, *Ivy*, *Box*, *Firre*, *Eugh*, *Cypresse*, *Iuniper*, *Bayes*, *Rose-Mary*, &c. The *Cause* of the Holding *Greene*, is the Close and Compact *Substance* 592

ſtance of their *Leaves*, and the *Pedicles* of them. And the *Cauſe* of that againe, is either the *Tough* and *Viſcous Iuyce* of the *Plant*; Or the *Strength* and *Heat* thereof. Of the firſt Sort is *Holly*; Which is of ſo *Viſcous* a *Iuyce*, as they make *Birdlime* of the *Barke* of it. The *Stalke* of *Ivy* is Tough, and not Fragile, as wee ſee in other ſmall Twigs drie. *Firre* yeeldeth *Pitch*. *Box* is a faſt and heavy *Wood*, as we ſee it in *Boules*. *Eugh* is a Strong and Tough *Wood*, as we ſee it in *Bowes*. Of the Second Sort is *Iuniper*, which is a *Wood* Odorate; and maketh a hot Fire. *Bayes* is like-wiſe a Hot and Aromaticall *Wood*; And ſo is *Roſe-Mary* for a *Shrub*. As for the *Leaves*, their Denſitie appeareth, in that, either they are Smooth and Shining, as in *Bayes*, *Holly*, *Ivie*, *Box*, &c. Or in in that they are Hard and Spirie, as in the reſt. And Triall would bee made of *Grafting* of *Roſe-Mary*, and *Bayes*, and *Box*, upon a *Holly-Stocke*; Becauſe they are *Plants* that come all *Winter*. It were good to trie it alſo with *Grafts* of other *Trees*, either *Fruit-Trees*, or *Wilde Trees*; To ſee whether they will not yeeld their *Fruit*, or beare their *Leaves*, later, and longer in the *Winter*; becauſe the *Sap* of the *Holly* putteth forth moſt in the *Winter*. It may bee alſo a *Mezerion-Tree*, grafted upon a *Holly*, will prove both an Earlier, and a Greater *Tree*.

593 There be ſome *Plants*, that beare no *Flower*, and yet beare *Fruit*: There be ſome, that beare *Flowers*, and no *Fruit*: There be ſome, that beare neither *Flowers*, nor *Fruit*. Moſt of the great *Timber-Trees*, (as *Oakes*, *Beeches*, &c.) beare no apparent *Flowers*: Some few (likewiſe) of the *Fruit-Trees*; As *Mulberry*, *Walnut*, &c. And ſome *Shrubs*, (as *Iuniper*, *Holly*, &c.) beare no *Flowers*. Divers *Herbs* alſo beare *Seeds*, (which is as the *Fruit*,) and yet beare no *Flowers*; As *Purſlane*, &c. Thoſe that beare *Flowers*, and no *Fruit*, are few; As the *Double Cherry*, the *Sallow*, &c. But for the *Cherry*, it is doubtfull, whether it be not by Art, or Culture; For if it bee by Art, then Triall would be made, whether *Apples*, and other *Fruits Bloſſomes*, may not be doubled. There are ſome Few, that beare neither *Fruit*, nor *Flower*; As the *Elme*, the *Poplars*, *Box*, *Brakes*, &c.

594 There be ſome *Plants*, that ſhoot ſtill upwards, and can *Support* themſelves; As the greateſt Part of *Trees*, and *Plants*: There be ſome Other, that *Creep* along the *Ground*; Or *Winde* about other *Trees*, or *Props*, and cannot ſupport themſelves; As *Vines*, *Ivie*, *Briar*, *Briony*, *Wood-bines*, *Hop's*, *Climatis*, *Camomill*, &c. The *Cauſe* is, (as hath beene partly touched,) for that all *Plants*, (naturally) move upwards; But if the *Sap* put up too faſt, it maketh a ſlender *Stalke*, which will not ſupport the weight: And therefore theſe latter Sort are all Swift and Haſtie Commers.

Experiments in Conſort, touching all Manner of *Compoſts*, and *Helps* of *Ground*.

THe firſt and moſt Ordinary *Helpe* is *Stercoration*. The *Sheeps-Dung* is one of the beſt; And next, the *Dung* of *Kine*: And thirdly, that of *Horſes*: Which is held to be ſomewhat too hot, unleſſe it be mingled. That of *Pigeons* for a Garden, as a ſmall Quantity of Ground, Excelleth. The *Ordering* of *Dung* is; If the *Ground* be *Arable*, to ſpread it immediately before the *Ploughing* and *Sowing*; And ſo to *Plough* it in: For if you ſpread it long before, the *Sunne* will draw out much of the *Fatneſſe* of the *Dung*: If the *Ground* be *Grazing Ground*, to ſpread it ſomewhat late, towards *Winter*; That the *Sunne* may have the leſſe Power to drie it up. As for ſpeciall *Compoſts* for *Gardens*, (as a *Hot Bed*, &c. (we have handled them before.

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596 The Second *Kind* of *Compoſt*, is, the *Spreading* of divers *Kinds* of *Earth*; As *Marle*, *Chalke*, *Sea-Sand*, *Earth* upon *Earth*, *Pond-Earth*; And the *Mixtures* of them. *Marle* is thought to be the beſt; As having moſt *Fatneſſe*; And not Heating

Heating the *Ground* too much. The next is *Sea-Sand*; Which (no doubt) obtaineth a speciall Vertue, by the *Salt*: For *Salt* is the first Rudiment of life. *Chalke* over-heateth the *Ground* a little. And therefore is best upon *Cold Clay-Grounds*, or *Moist Grounds*: But I heard a great *Husband* say, that it was a common Errour, to thinke that *Chalke* helpeth *Arable Grounds*, but helpeth not *Grazing Grounds*; Whereas (indeed) it helpeth *Grasse*, as well as *Corne*: but that which breedeth the Errour is, because after the *Chalking* of the *Ground*, they weare it out with many *Crops*, without Rest; And then (indeed) afterwards it will beare little *Grasse*, because the *Ground* is tyred out. It were good to trie the laying of *Chalke* upon *Arable Grounds*, a little while before *Ploughing*; And to *Plough* it in, as they doe the *Dung*; But then it must bee Friable first, by Raine, or Lying: As for *Earth*, it *Compasseth* it Selfe; For I knew a *Great Garden*, that had a *Field* (in a manner) powred upon it; And it did beare *Fruit* excellently the first yeare of the Planting: For the *Surface* of the *Earth* is ever the Fruitfullest. And *Earth* so prepared hath a double *Surface*. But it is true, as I conceive, that such *Earth*, as hath *Salt-Petre* bred in it, if you can procure it without too much charge, doth excell. The way to hasten the *Breeding* of *Salt-Petre*, is to forbid the Sunne, and the Growth of *Vegetables*. And therefore, if you make a large Hovell, thatched, over some Quantity of Ground; Nay, if you doe but Planck the Ground over, it will breed *Salt-Petre*. As for *Pond-Earth*, or *River-Earth*, it is a very good *Compost*; Especially if the *Pond* have beene long uncleansed, and so the *Water* be not too Hungry: And I judge it will be yet better, if there bee some *Mixture* of *Chalke*.

The Third *Helpe* of *Ground*, is, by some other *Substances*, that have a Vertue to make *Ground* Fertile; though they bee not meerely *Earth*: wherein *Ashes* excell; In so much as the Countries about *Ætna*, and *Vesuvius*, have a kinde of Amends made them, for the Mischiefe the Eruptions (many times) doe, by the exceeding *Fruitfulnesse* of the *Soile*, caused by the *Ashes*, scattered about. *Soot* also, though thinne spred, in a *Field* or *Garden*, is tried to bee a very good *Compost*. For *Salt*, it is too Costly: But it is tried, that mingled with *Seed-Corne*, and sowen together, it doth good: And I am of Opinion, that *Chalke* in Powder, mingled with *Seed-Corne*, would doe good; Perhaps as much as *Chalking* the *Ground* all over. As for the *Steeping* of the *Seeds*, in severall *Mixtures* with *Water*, to give them Vigour; Or *Watring Grounds* with *Compost-Water*; We have spoken of them before. 597

The Fourth *Helpe* of *Ground*, is, the *Suffering* of *Vegetables to die into the Ground*; And so to Fatten it; As the *Stubble* of *Corne*, Especially *Pease*. *Brakes* cast upon the *Ground*, in the beginning of *Winter*, will make it very Fruitfull. It were good (also) to trie, whether *Leaves* of *Trees* swept together, with some *Chalke* and *Dung* mixed, to give them more Heart, would not make a good *Compost*: For there is nothing lost, so much as *Leaves* of *Trees*; And as they lie scattered, and without Mixture, they rather make the *Ground* soure, than otherwise. 598

The Fifth *Help* of *Ground*, is *Heat* and *Warmth*. It hath been anciently practised to burne *Heath*, & *Ling*, and *Sedge*, with the vantage of the *Winde*, upon the *Ground*: Wee see, that *Warmth* of *Walls* and *Enclosures*, mendeth *Ground*: Wee see also that *Lying open* to the *South*, mendeth *Ground*: We see againe, that the *Foldings* of *Sheepe* helpe *Ground*, as well by their *Warmth*, as by their *compost*: And it may bee doubted, whether the *Covering* of the *Ground* with *Braks*, in the Beginning of the *Winter*, (whereof we spake in the last *Experiment*,) helpeth it not, by reason of the *Warmth*. Nay some very good 599

Husbands doe suspect, that the *Gathering* up of *Flints*, in *Flinty Ground*, and Laying them on *Heaps*, (which is much used,) is no good *Husbandry*; For that they would keepe the *Ground* Warme.

600 The Sixth *Helpe* of *Ground* is, by *Watering*, and *Irrigation*; which is in two Manners: The one by *Letting* in, and *Shutting* out *Waters*, at seasonable Times: For *Water*, at some Seasons, and with reasonable stay, doth good; But at some other Seasons, and with too long Stay, doth hurt. And this serveth onely for *Meadowes*, which are along some *River*. The other way is, to bring *Water*, from some *Hanging Grounds*, where there are *Springs*, into the *Lower Grounds*, carrying it in some long *Furrowes*; And from those *Furrowes*, drawing it traverse to spread the *Water*. And this maketh an excellent Improvement, both for *Corne*, and *Grasse*. It is the richer, if those *Hanging Grounds* be fruitfull, because it washeth off some of the Fatnesse of the *Earth*: But howsoever it profiteth much. Generally, where there are great Overflowes, in *Fens*, or the like, the drowning of them in the *Winter*, maketh the *Summer* following more fruitfull: The *Cause* may be, for that it keepeth the *Ground* warme, and nourisheth it: But the *Fen-Men* hold, that the *Sewers* must be kept so, as the *Water* may not stay too long in the *Spring*, till the *Weeds* and *Sedge* be growne up; For then the *Ground* will bee like a Wood, which keepeth out the Sunne; And so continueth the Wet; Whereby it will never graze (to purpose) that yeare. Thus much for *Irrigation*. But for *Avoidances*, and *Draynings* of water, where there is too much, and the *Helps* of *Ground* in that kinde, wee shall speake of them in another Place.

NATU-

NATVRALL HISTORIE.

VII. Century.

THe *Differences* betweene *Animate* and *Inanimate Bodies*, we shall handle fully under the *Title* of *Life*, and *Living Spirits*, and *Powers*. We shall therefore make but a briefe Mention of them in this Place. The Maine *Differences* are two. All *Bodies* have *Spirits*, and *Pneumaticall Parts* within them: But the Maine *Differences* betweene *Animate* and *Inanimate*, are two: The first is, that the *Spirits* of *Things Animate*, are all *Continued* with themselves, and are *Branched* in *Veines*, and secret *Canales*, as *Bloud* is: And in *Living Creatures*, the *Spirits* have not onely *Branches*, but certaine *Cells* or *Seats*, where the *Principall Spirits* doe reside, and whereunto the rest doe resort: But the *Spirits* in *Things Inanimate* are shut in, and cut off by the *Tangible Parts*; And are not pervious one to another; As *Aire* is in *Snow*. The second Maine *Difference* is, that the *Spirits* of *Animate Bodies* are all in some degree, (more or lesse,) kindled and inflamed; And have a fine *Commixture* of *Flame*, and an *Aëriall Substance*. But *Inanimate Bodies* have their *Spirits* no whit *Inflamed*, or *Kindled*. And this *Difference* consisteth not in the *Heat* or *Coolenesse* of *Spirits*; For *Cloves* and other *Spices*, *Naptha* and *Petroleum*, have exceeding *Hot Spirits*, (hotter a great deale than *Oile*, *Waxe*, or *Tallow*, &c.) but not *Inflamed*. And when any of those Weake and Temperate *Bodies* come to bee Inflamed, then they gather a much greater *Heat*, than others have *Vn-inflamed*; besides their *Light*, and *Motion*, &c.

Experiments in Consort, touching the *Affinities*, and *Differences*, between *Plants* and *Inanimate Bodies*.

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The *Differences*, which are *Secondary*, and proceed from these two *Radicall Differences*, are; First, *Plants* are all *Figurate* and *Determinate*, which *Inanimate Bodies* are not; For looke how farre the *Spirit* is able to Spread and Continue it selfe; So farre goeth the *Shape*, or *Figure*; And then is *determined*. Secondly, *Plants* doe nourish; *Inanimate Bodies* doe not: They have an *Accretion*, but no *Alimentation*. Thirdly, *Plants* have a *Period* of *Life*; which *Inanimate Bodies* have not. Fourthly, they have a *Succession*, and *propagation* of their *Kinde*; which is not in *Bodies Inanimate*.

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603 The *Differences* between *Plants*, and *Metals* or *Fossiles* besides those foure before mentioned, (For *Metalls* I hold Inanimate,) are these: First, *Metals* are more *Durable* than *Plants*: Secondly, they are more *Solid* and *Hard*: Thirdly, they are wholly *Subterrany*; Whereas *Plants* are part above *Earth*, and part under *Earth*.

604 There be very few *Creatures*, that participate of the *Nature* of *Plants*, and *Metalls* both; *Corall* is one of the Neareſt of both *Kindes*: Another is *Vitriol*, for that is apteſt to ſprout with *Moiſture*.

605 Another ſpeciall *Affinitie* is betweene *Plants* and *Mould* or *Putrefaction*: For all *Putrefaction* (if it diſſolve not in *Arefaction*) will in the end iſſue into *Plants*, or *Living Creatures* bred of *Putrefaction*. I account *Moſſe*, and *Muſhromes* and *Agaricke*, and other of those kinds, to be but *Moulds* of the *Ground*, *Walls*, and *Trees*, and the like. As for *Fleſh*, and *Fiſh*, and *Plants* themſelves, and a Number of other things, after a *Mouldineſſe*, or *Rottennes*, or *Corrupting*, they will fall to breed *Wormes*. These *Putrefactions*, which have *Affinitie* with *Plants*, have this *Difference* from them; That they have no *Succeſſion* or *Propagation*, though they *Nouriſh*, and have a *Period* of *Life*, and have likewiſe ſome *Figure*.

606 I left once, by chance, a *Citron* cut, in a cloſe Roome, for three Summer-moneths, that I was abſent; And at my Returne, there were growne forth, out of the Pith cut, *Tufts* of *Haires*, an Inch long, with little blacke Heads, as if they would have beene ſome *Herbe*.

Experiments in Conſort, touching the *Affinities*, and *Differences*, of *Plants*, and *Living Creatures*: And the *Confinehs* and *Participles* of them.

THe *Affinities* and *Differences* betweene *Plants* and *Living Creatures*, are these that follow. They have both of them *Spirits Continued*, and *Branched*, and alſo *Inflamed*: But firſt in *Living Creatures*, the *Spirits* have a *Cell* or *Seat*, which *Plants* have not; As was alſo formerly ſaid. And ſecondly, the *Spirits* of *Living Creatures* hold more of *Flame*, than the *Spirits* of *Plants* doe. And theſe two are the *Radicall Differences*. For the *Secondary Differences*, They are, as follow. First, *Plants* are all *Fixed* to the *Earth*; Whereas all *Living Creatures* are ſevered, and of themſelves. Secondly, *Living Creatures* have *Locall Motion*; *Plants* have not. Thirdly, *Living Creatures* nouriſh from their *Vpper Parts*, by the *Mouth* chiefly; *Plants* nouriſh from below, namely from the *Rootes*. Fourthly, *Plants* have their *Seed* and *Seminall Parts* uppermoſt; *Living Creatures* have them lowermoſt: And therefore it was ſaid, not elegantly alone, but Philoſophically; *Homo eſt Planta inverſa*; *Man is like a Plant turned upwards*: For the *Root* in *Plants*, is as the *Head* in *Living Creatures*. Fifthly, *Living Creatures* have a more exact *Figure* than *Plants*. Sixthly, *Living Creatures* have more *Diverſity* of *Organs* within their *Bodies*, and (as it were) *Inward Figures*, than *Plants* have. Seventhly, *Living Creatures* have *Senſe*, which *Plants* have not. Eighthly, *Living Creatures* have *Voluntary Motion*, which *Plants* have not.

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608 For the *Difference* of *Sexes* in *Plants*, they are oftentimes by name diſtinguiſhed; As *Male-Piony*, *Female-Piony*; *Male-Roſe-mary*, *Female-Roſe-mary*; *Hee-Holly*, *Shee-Holly*, &c. but *Generation* by *Copulation* (certainly) extendeth not to *Plants*. The neareſt Approach of it, is betweene the *Hee-Palme*, and the *Shee-Palme*; which, (as they report,) if they grow neare, incline the one to the other: In ſo much as, (that which is more ſtrange,) they doubt not to report, that to keep the *Trees* upright from Bending, they tye *Ropes*, or *Lines*, from the one to the other, that the *Contact* might be enjoyed by the *Contact* of a *Middle Body*. But this may be Faigned, or at leaſt Amplified. Nevertheleſſe, I am apt enough to thinke, that this ſame *Binarium* of a

Stronger

Stronger and a Weaker, like unto *Masculine* and *Feminine*, doth hold in all *Living Bodies*. It is confounded sometimes; As in some *Creatures* of *Putrefaction*, wherein no *Markes* of *Distinction* appeare: and it is doubled sometimes; As in *Hermaphrodites*: But generally there is a Degree of Strength in most *Species*.

The *Participles* or *Confiners* between *Plants* and *Living Creatures*, are such chiefly, as are *Fixed*, and have no *Locall Motion* of *Remove*, though they have a *Motion* in their *Parts*; Such as are *Oysters*, *Cockles*, and such like. There is a Fabulous Narration, that in the *Northerne Countries*, there should be an *Herb* that groweth in the likenesse of a *Lambe*, and feedeth upon the *Grasse*, in such sort, as it will bare the *Grasse* round about. But I suppose that the *Figure* maketh the *Fable*; For so wee see, there be *Bee-Flowers*, &c. And as for the *Grasse*, it seemeth the *Plant*, having a great *Stalke* and *Top*, doth prey upon the *Grasse*, a good way about, by drawing the *Iuyce* of the *Earth* from it. 609

Experiments *Promiscuous* touching *Plants*.

The *Indian Fig* boweth his *Roots* downe so low, in one yeare, as of it selfe it taketh *Root* againe: And so multiplyeth from *Root* to *Root*; Making of one *Tree* a kinde of *Wood*. The *Cause* is the *Plenty* of the *Sap*, and the *Sofinesse* of the *Stalke*, which maketh the *Bough*, being over-loaden, and not stiffely upheld, weigh downe. It hath *Leaves*, as broad as a little *Target*, but the *Fruit* no bigger than *Beanes*. The *Cause* is, for that the continuall Shade increaseth the *Leaves*, and abateth the *Fruit*; which nevertheless is of a pleasant Taste. And that (no doubt) is caused, by the *Suppleness* and *Gentleness* of the Juyce of that *Plant*, being that which maketh the *Boughes* also so Flexible. 610

It is reported by one of the *Ancients*, that there is a certain *Indian Tree*, having few, but very great, *Leaves*, three Cubits long, and two broad; And that the *Fruit* being of good Taste, groweth out of the *Barke*. It may be, there be *Plants* that poure out the *Sap* so fast, as they have no leisure, either to divide into many *Leaves*, or to put forth *Stalkes* to the *Fruit*. With us *Trees* (generally) have small *Leaves* in comparison. The *Fig* hath the greatest; And next it the *Vine*, *Mulberry*, and *Sycamore*; And the least are those of the *Willow*, *Birch*, and *Thorne*. But there be found *Herbs* with farre greater *Leaves* than any *Tree*; As the *Burre*, *Gourd*, *Cucumber*, and *Colewort*. The *Cause* is, (like to that of the *Indian Fig*,) the hasty and plentifull Putting forth of the *Sap*. 611

There be three *Things* in use for *Sweetnesse*; *Sugar*, *Honey*, *Manna*. For *Sugar*, to the *Ancients* it was scarce knowne, and little used. It is found in *Canes*: *Quære*, whether to the first *Knuckle*, or further up? And whether the very *Barke* of the *Cane* it selfe doe yeeld *Sugar*, or no? For *Honey*, the *Bee* maketh it, or gathereth it; But I have heard from one, that was industrious in Husbandry, that the labour of the *Bee* is about the *Wax*; And that hee hath knowne in the beginning of *May*, *Honey-Combes* empty of *Honey*; And within a fortnight, when the Sweet *Dewes* fall, filled like a *Cellar*. It is reported by some of the *Ancients*, that there is a *Tree* called *Occhus*, in the Valleyes of *Hyrcania*, that distilleth *Honey* in the *Mornings*. It is not unlike, that the *Sap* and *Teares* of some *Trees*, may be sweet. It may be also, that some sweet Juyces, fit for many uses, may bee concocted out of *Fruits*, to the Thicknesse of *Honey*, or perhaps of *Sugar*; The likeliest are *Rasins* of the Sunne, *Figs*, and *Corrans*: The Meanes may be enquired. 612

The *Ancients* report of a *Tree*, by the *Persian Sea*, upon the *Shore-Sands*, which 613

which is nourished with the *Salt-Water*; And when the *Tide* ebbeth, you shall see the *Roots*, as it were, bare without *Barke*, (being as it seemeth corroded by the *Salt*,) and grasping the *Sands* like a *Crab*; Which nevertheless beareth a *Fruit*. It were good to trie some *Hard Trees*, as a *Service-Tree*, or *Firre-Tree*, by setting them within the *Sands*.

614 There bee of *Plants*, which they use for *Garments*, these that follow. *Hempe*; *Flax*; *Cotton*; *Nettles*, (whereof they make *Nettle-Cloth*;) *Sericum*, which is a *Growing Silke*; They make also *Cables* of the *Barke* of *Lime-Trees*. It is the *Stalke* that maketh the *Filaceous* Matter, commonly; And sometimes the *Downe* that groweth above.

615 They have, in some *Countries*, a *Plant* of a *Rosy Colour*, which shutteth in the *Night*, Openeth in the *Morning*, and Openeth wide at *Noone*; which the *Inhabitants* of those *Countries* say is a *Plant* that *Sleepeth*. There bee *Sleepers* enough then; For almost all *Flowers* doe the like.

616 Some *Plants* there are, but rare, that have a *Mossy* or *Downy Root*; And likewise that have a Number of *Threds*, like *Beards*; As *Mandrakes*; whereof *Witches*, and *Impostours* make an ugly *Image*, giving it the Forme of a *Face* at the *Top* of the *Root*, and leave those *Strings* to make a broad *Beard* down to the Foot. Also there is a Kinde of *Nard*, in *Creet*, (being a Kinde of *Phu*) that hath a *Root* hairy, like a *Rough-Footed-Doves* foot. So as you may see, there are of *Roots*, *Bulbous Roots*, *Fibrous Roots*, and *Hirsute Roots*. And, I take it, in the *Bulbous*, the Sap hasteneth most to the Aire, and Sunne: In the *Fibrous*, the Sap delighteth more in the Earth, and therefore putteth downward: And the *Hirsute* is a Middle betweene both; That besides the Putting forth upwards, and downwards; putteth forth in Round.

617 There are some *Teares* of *Trees*, which are kembed from the *Beards* of *Goats*: For when the *Goats* bite and crop them, especially in the Mornings, the Dew being on, the *Teare* commeth forth, and hangeth upon their *Beards*: Of this Sort is some kinde of *Ladanum*.

618 The *Irrigation* of the *Plane-Tree* by *Wine*, is reported by the *Ancients*, to make it Fruitfull. It would be tried likewise with *Roots*; For upon *Seeds* it worketh no great Effects.

619 The way to carry *Forraine Roots*, a long Way, is to vessell them close in *Earthen Vessels*. But if the *Vessels* be not very Great, you must make some Holes in the Bottome, to give some Refreshment to the *Roots*; Which otherwise (as it seemeth,) will decay, and suffocate.

620 The ancient *Cinnamon*, was, of all other *Plants*, while it grew, the Dryest; And those Things, which are knowne to comfort other *Plants*, did make that more Sterill: For in *Showers* it prospered worst: It grew also amongst *Bushes* of other kindes, where commonly *Plants* doe not thrive: Neither did it love the Sunne: There might be one *Cause* of all those Effects; Namely, the sparing Nourishment, which that *Plant* required. *Quære* how farre *Cassia*, which is now the Substitute of *Cinnamon*, doth participate of these Things.

621 It is reported by one of the *Ancients*, that *Cassia*, when it is gathered, is put into the *Skins* of *Beasts*, newly fleyed; And that the *Skins* Corrupting, and Breeding *Wormes*, the *Wormes* doe devoure the *Pith* and *Marrow* of it, and so make it Hollow; But Meddle not with the *Barke*, because to them it is bitter.

622 There were, in Ancient Time, *Vines*, of farre greater *Bodies*, then we know any; For there have been *Cups* made of them, and an *Image* of *Iupiter*. But it is like they were *Wilde-Vines*; For the *Vines*, that they use for *Wine*, are so often

often Cut, and ſo much Digged and Dreſſed, that their Sap ſpendeth into the *Grapes*, and ſo the *Stalke* cannot increaſe much in *Bulke*. The *Wood* of *Vines* is very durable, without *Rotting*. And that which is ſtrange, though no *Tree* hath the *Twigges*, while they are green, ſo brittle, yet the *Wood* dried is extreame Tough; And was uſed by the *Captaines* of *Armies*, amongſt the *Romans*, for their *Cudgells*.

It is reported, that in ſome Places, *Vines* are ſuffered to grow like *Herbs*, ſpreading upon the *Ground*; And that the *Grapes* of thoſe *Vines* are very great. It were good to make triall, whether *Plants* that uſe to bee borne up by Props, will not put forth greater *Leaves*, and greater *Fruits*, if they be laid along the *Ground*; As *Hops*, *Ivie*, *Woodbine*, &c. 623

Quinces, or *Apples*, &c. if you will keep them long, drowne them in *Honey*; But becauſe *Honey* (perhaps) will give them a Taſte Overluſhious, it were good to make Triall in *Powder* of *Sugar*; Or in *Syrrup* of *Wine* onely Boyled to Height. Both theſe would likewiſe be tried in *Orenges*, *Limons*, and *Pomegranats*; For the *Powder* of *Sugar*, and *Syrrup* of *Wine*, will ſerve for times more than once. 624

The *Conſervation* of *Fruit* would be alſo tried in *Veſſels*, filled with *Fine Sand*, or with *Powder* of *Chalke*; Or in *Meale* and *Flower*; Or in *Duſt* of *Oakewood*; Or in *Mill*. 625

Such *Fruits*, as you appoint for *Long Keeping*, you muſt gather before they be full *Ripe*; And in a *Faire* and *Drie Day*, towards *Noone*; And when the *Winde* bloweth not *South*; And when the *Moone* is under the *Earth*; And in *Decreaſe*. 626

Take *Grapes*, and hang them in an *Empty Veſſell*, well Stopped; And ſet the *Veſſell*, not in a *Cellar*, but in ſome drie *Place*; And it is ſaid, they will laſt long. But it is reported by ſome, they will keepe better, in a *Veſſell* halfe full of *Wine*, ſo that the *Grapes* touch not the *Wine*. 627

It is reported, that the *Preſerving* of the *Stalke*, helpeth to preſerve the *Grape*; Eſpecially if the *Stalke* be put into the *Pith* of *Elder*, the *Elder* not touching the *Fruit*. 628

It is reported by ſome of the *Ancients*, that *Fruit* put in *Bottles*, and the *Bottles* let downe into *Wells* under *Water*, will keep long. 629

Of *Herbs* and *Plants*, ſome are good to eat *Raw*; As *Lettuce*, *Endive*, *Purſlane*, *Tarragon*, *Creſſes*, *Cucumbers*, *Musk-Melons*, *Radiſh*, &c. Others onely after they are *Boyled*, or have *Paſſed the Fire*; As *Parſley*, *Clary*, *Sage*, *Parſnips*, *Turnips*, *Aſparagus*, *Artichoakes*, (though they alſo being young are eaten *Raw*:) But a Number of *Herbs* are not *Eſculent* at all; As *Worme-Wood*, *Graſſe*, *Greene-Corne*, *Centory*, *Hyſſope*, *Lavender*, *Balme*, &c. The *Cauſes* are, for that the *Herbs*, that are not *Eſculent*, doe want the two *Taſtes*, in which *Nouriſhment* reſteth; Which are, *Fat*, and *Sweet*; And have (contrariwiſe) *Bitter*, and *Over-ſtrong Taſtes*, or a *Iuyce* ſo Crude, as cannot bee ripened to the degree of *Nouriſhment*. *Herbs* and *Plants*, that are *Eſculent Raw*, have *Fatneſſe*, or *Sweetneſſe*, (as all Eſculent *Fruits*;) Such are *Onions*, *Lettuce*, &c. But then it muſt be ſuch a *Fatneſſe*, (for as for *Sweet Things*, they are in effect alwayes *Eſculent*,) as is not Over-groſſe, and Loading of the *Stomach*; For *Parſnips* and *Leekes* have *Fatneſſe*; But it is too Groſſe and Heavy without *Boyling*. It muſt be alſo in a Subſtance ſomewhat Tender; For wee ſee *Wheat*, *Barley*, *Artichoakes*, are no good *Nouriſhment*, till they have paſſed the *Fire*; But the *Fire* doth ripen, and maketh them ſoft and tender, and ſo they become *Eſculent*. As for *Radiſh*, and *Tarragon*, and the like, they are for *Condiments*, and not for *Nouriſhment*. And even ſome of thoſe *Herbes*, which are not *Eſculent*, 630

lent, are notwithstanding *Poculent*; As *Hop's*, *Broome*, &c. *Quære* what *Herbs* are good for *Drinke*, besides the two aforenamed; For that it may (perhaps) ease the Charge of *Brewing*, if they make *Beere* to require lesse *Malt*, or make it last longer.

631 *Parts* fit for the *Nourishment* of *Man*, in *Plants*, are, *Seeds*, *Roots*, and *Fruits*; But chiefly *Seeds*, and *Roots*. For *Leaves*, they give no *Nourishment* at all, or very little: No more doe *Flowers*, or *Blossomes*, or *Stalkes*. The Reason is, for that *Roots*, and *Seeds*, and *Fruits*, (in as much as all *Plants* consist of an *Oyly* and *Watrie Substance* commixed,) have more of the *Oily Substance*; And *Leaves*, *Flowers*, &c. of the *Watry*. And secondly, they are more *Concocted*; For the *Root*, which continueth ever in the *Earth*, is still *Concocted* by the *Earth*; And *Fruits*, and *Graines*, (wee see) are halfe a yeare, or more, in *Concocting*; Whereas *Leaves* are out, and Perfect in a Moneth.

632 *Plants* (for the most part) are more strong, both in *Taste*, and *Smell*, in the *Seed*, than in the *Leafe*, and *Root*. The *Cause* is, for that in *Plants*, that are not of a Fierce and Eager *Spirit*, the Vertue is increased by *Concoction*, and *Maturation*, which is ever most in the *Seed*; But in *Plants*, that are of a Fierce and Eager Spirit, they are stronger whilest the *Spirit* is enclosed in the *Root*; And the *Spirits* doe but weaken, and dissipate, when they come to the *Aire*, and *Sunne*; As we see it in *Onions*, *Garlicke*, *Dragon*, &c. Nay there be *Plants*, that have their *Roots* very *Hot*, and *Aromaticall*; And their *Seeds* rather *Insipide*; As *Ginger*. The *Cause* is (as was touched before,) for that the *Heat* of those *Plants* is very Dissipable; which under the *Earth* is contained and held in; But when it commeth to the *Aire*, it exhaleth.

633 The *Iuyces* of *Fruits* are either *Watry*, or *Oylie*. I reckon amongst the *Watry*, all the *Fruits* out of which *Drinke* is expressed; As the *Grape*, the *Apple*, the *Peare*, the *Cherry*, the *Pomegranate*, &c. And there are some others, which, though they be not in use for *Drinke*, yet they appeare to bee of the same *Nature*; As *Plums*, *Services*, *Mulberries*, *Rasps*, *Orenges*, *Limons*, &c. And for those *Iuyces*, that are so fleshy, as they cannot make *Drinke* by Expression, yet (perhaps) they may make *Drinke* by Mixture of *Water*;

Poculaque admistis imitantur vitea Sorbis.

And it may be *Heps* and *Brier-Berries* would doe the like. Those that have *Oylie Iuyces*, are; *Olives*, *Almonds*, *Nuts* of all sorts, *Pine-Apples*, &c. And their *Iuyces* are all *Inflammable*. And you must observe also, that some of the *Watry Iuyces*, after they have gathered *Spirit*, will Burne and Enflame; As *Wine*. There is a Third Kinde of *Fruit*, that is sweet, without either *Sharpenesse*, or *Oylinesse*: Such as is the *Fig*, and the *Date*.

634 It hath beene noted, that most *Trees*, and specially those that beare *Mast*, are fruitfull but once in two yeares. The *Cause* (no doubt) is, the *Expence* of *Sap*; For many *Orchard-Trees*, well Cultured, will beare divers yeares together.

635 There is no *Tree*, which besides the *Naturall Fruit*, doth beare so many *Bastard-Fruits*, as the *Oake* doth: For besides the *Acorne*, it beareth *Galls*, *Oake-Apples*, and certaine *Oake-Nuts*, which are Inflammable; And certaine *Oake-Berries*, sticking close to the *Body* of the *Tree*, without *Stalke*. It beareth also *Misseltoe*, though rarely. The *Cause* of all these may be, the *Closenesse* and *Solidnesse* of the *Wood*, and *Pith* of the *Oake*; Which maketh severall *Iuyces* finde severall *Eruptions*. And therefore if you will devise to make any *Super-Plants*, you must ever give the *Sap* Plentifull Rising, and Hard Issue.

There

There are two *Excrescences*, which grow upon *Trees*; Both of them in the Nature of *Mushromes*: The one the *Romanes* called *Boletus*; Which groweth upon the *Roots* of *Oakes*; And was one of the *Dainties* of their *Table*; The other is *Medicinall*, that is called *Agaricke*, (whereof we have spoken before,) which groweth upon the Tops of *Oakes*; Though it be affirmed by some, that it groweth also at the *Roots*. I doe conceive, that many *Excrescences* of *Trees* grow chiefly, where the *Tree* is dead, or faded; For that the *Naturall Sap* of the *Tree*, corrupteth into some *Preternaturall Substance*. 636

The greater Part of *Trees* beare *Most*, and *Best*, on the *Lower-Boughes*; As *Oakes*, *Figs*, *Wall-Nuts*, *Peares*, &c. But some beare *Best* on the *Top-Boughes*; As *Crabs*, &c. Those that beare best below, are such, as Shade doth more good to, than Hurt. For generally all *Fruits* beare best lowest; Because the *Sap* tireth not, having but a short Way: And therefore in *Fruits* spred upon *Walls*, the Lowest are the Greatest, as was formerly said; So it is the *Shade* that hindereth the *Lower-Boughes*; Except it be in such *Trees*, as delight in *Shade*; Or at least beare it well. And therefore, they are either Strong *Trees*, as the *Oake*; Or else they have large *Leaves*, as the *Wallnut* and *Fig*; Or else they grow in *Piramis*, as the *Peare*. But if they require very much *Sunne*, they beare best on the *Top*; As it is in *Crabs*, *Apples*, *Plums*, &c. 637

There be *Trees*, that beare best, when they begin to bee *Old*; As *Almonds*, *Peares*, *Vines*, and all *Trees* that give *Mast*. The *Cause* is, for that all *Trees*, that beare *Mast*, have an *Oyly Fruit*; And *Young Trees* have a more *Watry Iuyce*, and lesse Concocted; And of the same kinde also is the *Almond*. The *Peare* likewise, though it be not *Oylie*, yet it requireth much *Sap*, and well Concocted; For we see it is a Heavy *Fruit*, and Solide; Much more than *Apples*, *Plums*, &c. As for the *Vine*, it is noted, that it beareth more *Grapes* when it is *Young*; But *Grapes* that make better *Wine*, when it is *Old*; For that the *Iuyce* is better Concocted: And we see, that *Wine* is Inflammable; So as it hath a kinde of *Oylinesse*. But the most Part of *Trees*, amongst which are *Apples*, *Plums*, &c. beare best when they are *Young*. 638

There be *Plants*, that have a *Milke* in them, when they are Cut; As *Figs*, *Old-Lettuce*, *Sow-Thistles*, *Spurge*, &c. The *Cause* may be an *Inception* of *Putrefaction*; For those *Milkes* have all an *Acrimony*; Though one would thinke they should be *Lenitive*. For if you write upon Paper, with the *Milke* of the *Fig*, the Letters will not be seene, untill you hold the Paper before the Fire, & then they wax Brown; which sheweth that it is a Sharp or Fretting *Iuyce*: *Lettuce* is thought Poysonous, when it is so *Old*, as to have *Milke*; *Spurge* is a kinde of Poyson in it Selfe; And as for *Sow-Thistles*, though Coneyes eate them, yet Sheep and Cattell will not touch them; And besides, the *Milke* of them, rubbed upon Warts, in short time, weareth them away: Which sheweth the *Milke* of them to be *Corrosive*. We see also, that *Wheat*, & other *Corn sowen*, if you take them forth of the *Ground*, before they sprout, are full of *Milke*; And the Beginning of *Germination* is ever a Kinde of *Putrefaction* of the *Seed*. *Euphorbium* also hath a *Milke*, though not very white, which is of a great *Acrimony*. And *Saladine* hath a yellow *Milke*, which hath likewise much *Acrimony*; For it cleanseth the *Eyes*. It is good also for *Cataracts*. 639

Mushromes are reported to grow, as well upon the *Bodies* of *Trees*, as upon their *Roots*, or upon the *Earth*: And especially upon the *Oake*. The *Cause* is, for that strong *Trees*, are towards such *Excrescences*, in the Nature of *Earth*; And therefore put forth *Mosse*, *Mushromes*, and the like. 640

There

641 There is hardly found a *Plant*, that yeeldeth a *Red Iuyce*, in the *Blade*, or *Eare*; Except it bee the *Tree* that beareth *Sanguis Draconis*: Which groweth (chiefly) in the *Island Soquotra*: The *Herbe Amaranthus*, (indeed,) is *Red* all over; And *Brasill* is *Red* in the *Wood*: And so is *Red Sanders*. The *Tree* of the *Sanguis Draconis*, groweth in the forme of a *Sugar-Loafe*. It is like, the *Sap* of that *Plant*, concocteth in the *Body* of the *Tree*. For we see that *Grapes*, and *Pomegranats*, are *Red* in the *Iuyce*, but are *Greene* in the *Teare*: And this maketh the *Tree* of *Sanguis Draconis*, lesser towards the *Top*; Because the *Iuyce* hasteneth not up; And besides, it is very *Astringent*; And therefore of Slow Motion.

642 It is reported, that *Sweet Mosse*, besides that upon the *Apple-Trees*, groweth likewise (sometimes) upon *Poplars*; And yet (generally) the *Poplar* is a Smooth *Tree* of *Barke*, and hath little *Mosse*. The *Mosse* of the *Larix Tree* burneth also sweet, and sparkleth in the Burning. *Quære* of the *Mosses* of *Odorate Trees*; As *Cedar*, *Cypres*, *Lignum Aloës*, &c.

643 The *Death* that is most without Paine, hath beene noted to be, upon the *Taking* of the *Potion* of *Hemlocke*; which in Humanity was the Forme of *Execution* of *Capitall Offenders* in *Athens*. The *Poyson* of the *Aspe*, that *Cleopatra* used, hath some affinity with it. The *Cause* is, for that the *Torments* of *Death* are chiefly raised by the Strife of the *Spirits*; And these *Vapours* quench the *Spirits* by *Degrees*; Like to the *Death* of an extreme Old Man. I conceive it is lesse Painfull than *Opium*, because *Opium* hath Parts of *Heat* mixed.

644 There be *Fruits*, that are *Sweet* before they be *Ripe*; As *Mirabolanes*; So *Fennell-Seeds* are Sweet before they ripen, and after grow Spicy. And some never *Ripen* to be *Sweet*; As *Tamarinds*, *Barberries*, *Crabs*, *Sloes*, &c. The *Cause* is, for that the former Kinde have much and subtile *Heat*, which causeth Early Sweetnesse; The latter have a *Cold* and *Acide Iuyce*, which no *Heate* of the *Sunne* can sweeten. But as for the *Mirabolane*, it hath Parts of Contrary *Natures*; For it is *Sweet*, and yet *Astringent*.

645 There be few *Herbs* that have a *Salt Taste*; And contrariwise all *Bloud* of *Living Creatures* hath a *Saltnesse*: The *Cause* may bee, for that *Salt*, though it be the *Rudiment* of *Life*, yet in *Plants* the Originall *Taste* remaineth not; For you shall have them *Bitter*, *Sower*, *Sweet*, *Biting*, but seldome *Salt*: But in *Living Creatures*, all those High *Tastes* may happen to be (sometimes) in the *Humours*, but are seldome in the *Flesh*, or *Substance*; Because it is of a more *Oyly Nature*; which is not very Susceptible of those *Tastes*; And the *Saltnesse* it selfe of *Bloud*, is but a light, and secret *Saltnesse*: And even among *Plants*, some doe participate of *Saltnesse*, as *Alga Marina*, *Samphire*, *Scorvy-Grasse*, &c. And they report, there is, in some in the *Indian Seas*, a *Swimming Plant*, which they call *Salgazus*, spreading over the *Sea*, in such sort, as one would thinke it were a *Meadow*. It is certaine, that out of the *Ashes*, of all *Plants*, they extract a *Salt*, which they use in *Medicines*.

646 It is reported by one of the *Ancients*, that there is an *Herbe* growing in the *Water*, called *Linoostis*, which is full of *Prickles*: This *Herbe* putteth forth another small *Herbe* out of the *Leafe*; which is imputed to some *Moisture*, that is gathered betweene the *Prickles*, which Putrified by the *Sunne*, Germinateth. But I remember also I have seene, for a great Rarity, one *Rose* grow out of another, like *Honey-Suckles*, that they call *Top* and *Top-gallants*.

647 *Barley*, (as appeareth in the *Malting*,) being steeped in *Water* three dayes, and afterwards the *Water* drained from it, and the *Barley* turned upon a drie floare, will sprout, halfe an Inch long at least: And if it bee let alone, and not

not turned, much more; untill the Heart be out. *Wheat* will doe the same. Trie it also with *Pease*, and *Beanes*. This *Experiment* is not like that of the *Orpin*, and *Semper-Vive*; For there it is of the old Store, for no *Water* is added; But here it is nourished from the *Water*. The *Experiment* would be further driven: For it appeareth already, by that which hath beene said, that *Earth*, is not necessary to the first Sprouting of *Plants*; And we see that *Rose-Buds* set in *Water*, will Blow: Therefore trie whether the *Sprouts* of such *Graines* may not be raised to a further Degree; As to an *Herbe*, or *Flower*, with *Water* onely; Or some small commixture, of *Earth*: For if they will, it should seeme by the *Experiments* before, both of the *Malt*, and of the *Roses*, that they will come farre faster on in *Water*, than in *Earth*: For the *Nourishment* is easilier drawne out of *Water*, than out of *Earth*. It may give some light also, that *Drink* infused with *Flesh*, as that with the *Capon*, &c. will nourish faster and easilier, than *Meat* and *Drinke* together. Trie the same *Experiment* with *Roots*, as well as with *Graines*: as for Example, take a *Turnip*, and steepe it a while, and then drie it, and see whether it will sprout.

648 *Malt* in the *Drenching* will swell; And that in such a manner, as after the Putting forth in Sprouts, and the drying upon the Keele, there will bee gained at least a Bushell in eight, and yet the Sprouts are rubbed off; And there will be a Bushell of *Dust* besides the *Malt*: Which I suppose to be, not onely by the loose, and open Laying of the *Parts*, but by some Addition of *Substance*, drawne from the *Water*, in which it was steeped.

649 *Malt* gathereth a *Sweetnesse* to the *Taste*, which appeareth yet more in the *Wort*. The *Dulcoration* of *Things* is worthy to be tried to the full; For that *Dulcoration* importeth a degree to *Nourishment*: And the Making of *Things Inalimentall*, to become *Alimentall*, may be an *Experiment* of great Profit, for Making new *Victuall*.

650 Most *Seeds* in the Growing, leave their *Huck* or *Rinde* about the *Root*; But the *Onion* will carry it up, that it will be like a Cap upon the Top of the *Young Onion*. The *Cause* may be, for that the *Skin* or *Huske* is not easie to break; as we see by the Pilling of *Onions*, what a holding *Substance* the *Skin* is.

651 *Plants*, that have *Curled Leaves*, doe all abound with *Moysture*; Which commeth so fast on, as they cannot spread themselves Plain, but must needs gather together. The Weakest Kinde of *Curling* is *Roughnesse*; As in *Clary*, and *Burre*. The Second is *Curling* on the Sides; As in *Lettuce*, and *Young Cabbage*: And the Third is *Folding* into an *Head*; As in *Cabbage* full growne, and *Cabbage-Lettuce*.

652 It is reported, that *Firre*, and *Pine*, especially if they be *Old* and *Putrified*, though they shine not, as some *Rotten Woods* doe, yet in the sudden *Breaking* they will sparkle like Hard *Sugar*.

653 The *Roots* of *Trees* doe, (some of them,) put downwards deepe into the *Ground*; As the *Oake*, *Pine*, *Firre*, &c. Some spread more towards the *Surface* of the *Earth*: As the *Ash*, *Cypresse-Tree*, *Olive*, &c. The *Cause* of this latter may be, for that such *Trees* as love the *Sunne*, doe not willingly descend farre into the *Earth*; And therefore they are (commonly) *Trees*, that shoot up much; For in their *Body*, their desire of Approach to the *Sunne*, maketh them spread the lesse. And the same Reason, under *Ground*, to avoid Recesse from the *Sunne*, maketh them spread the more. And we see it commeth to passe in some *Trees*, which have beene planted too deepe in the *Ground*, that for love of Approach to the *Sunne*, they forsake their first *Root*, and put out another more towards the *Top* of the *Earth*. And wee see also, that the *Olive* is full of *Oylie Iuyce*; And *Ash* maketh the best Fire; And

Cypresse is an *Hot Tree*. As for the *Oake*, which is of the former sort, it loveth the *Earth*; And therefore groweth slowly. And for the *Pine*, and *Firre* likewise, they have so much *Heat* in themselves, as they need lesse the *Heat* of the *Sunne*. There be *Herbs* also, that have the same difference; As the *Herbe* they call *Morsus Diaboli*; which putteth the *Root* downe so low, as you cannot pull it up without *Breaking*; Which gave Occasion to the *Name*, and *Fable*; For that it was said, it was so wholsome a *Root*, that the *Devill*, when it was gathered, bit it for *Envy*: And some of the *Ancients* doe report, that there was a goodly *Firre*, (which they desired to remove whole, that had a *Root* under *Ground* eight Cubits deep; And so the *Root* came up broken.

654 It hath beene observed, that a *Branch* of a *Tree*, being *Vnbarked* some space at the Bottome, and so set into the *Ground*, hath growen; even of such *Trees*, as if the *Branch* were set with the *Barke* on, they would not grow; yet contrariwise we see, that a *Tree* Pared round in the *Body*, above *Ground*, will die. The *Cause* may be, for that the *Vnbarkt Part* draweth the Nourishment best, but the *Barke* continueth it onely.

655 *Grapes* will continue *Fresh*, and *Moist*, all Winter long, if you hang them, *Cluster* by *Cluster*, in the *Roofe* of a *Warme Roome*; Especially, if when you gather the *Cluster*, you take off with the *Cluster* some of the *Stocke*.

656 The *Reed* or *Cane* is a *Watry Plant*, and groweth not but in the *Water*; It hath these Properties; That it is *Hollow*; That it is *Knuckled* both *Stalke*, and *Root*; that being *Drie*, it is more *Hard* and *Fragile*, than other *Wood*, That it putteth forth no *Boughs*, though many *Stalks* out of one *Root*. It differeth much in greatnesse; The smallest being fit for Thatching of Houses; And Stopping the Chinkes of Ships; Better than Glew, or Pitch. The Second Bignesse, is used for Angle-Rods, and Staves; And in *China* for beating of Offenders upon the Thighs. The differing *Kinds* of them are; The *Common Reed*; The *Cassia Fistula*; And the *Sugar-Reed*. Of all *Plants*, it boweth the easiest, and riseth againe. It seemeth, that amongst *Plants*, which are nourished with *Mixture* of *Earth* and *Water*, it draweth most Nourishment from *Water*; which maketh it the *Smoothest* of all others in *Barke*; And the *Hollowest* in *Body*.

657 The *Sap* of *Trees*, when they are let *Bloud*, is of differing *Natures*. Some more *Watrie* and *Cleare*; As that of *Vines*; of *Beeches*; of *Peares*. Some *Thick*; As *Apples*. Some *Gummy*; as *Cherries*. Some *Froathy*; As *Elmes*. Some *Milkie*; As *Figs*. In *Mulberries*, the *Sap* seemeth to be (almost) towards the *Barke* onely; For if you cut the *Tree* a little into the *Barke*, with a *Stone*, it will come forth; If you pierce it deeper with a *Toole*, it will bee drie. The *Trees*, which have the *Moistest Iuyces* in their *Fruit*, have commonly the *Moistest Sap* in their *Bodie*; For the *Vines* and *Peares* are very *Moist*; *Apples* somewhat more *Spongie*: The *Milke* of the *Figge* hath the Qualitie of the *Rennet*, to gather *Cheese*: And so have certaine *Soure Herbs* wherewith they make *Cheese* in *Lent*.

658 The *Timber* and *Wood* are, in some *Trees*, more *Cleane*, in some more *Knottie*; And it is a good Triall, to trie it by Speaking at one End, and Laying the Eare at the Other: For if it be *Knottie*, the Voice will not passe well. Some have the *Veines* more varied and chamloted; As *Oake*, whereof *Wainscot* is made; *Maple*, whereof *Trenchers* are made: Some more smooth, as *Firre* and *Walnut*: Some doe more easily breed *Wormes* and *Spiders*; Some more hardly, as it is said of *Irish Trees*: Besides there bee a Number of Differences that concerne their Use; As *Oake*, *Cedar*, and *Chesnut*, are the

the best Builders: Some are best for *Plough-Timber*; As *Ash*; Some for *Peeres*, that are sometimes wet, and sometimes drie; As *Elme*: Some for *Planchers*; As *Deale*: Some for *Tables*, *Cupboards*, and *Deskes*; As *Walnuts*: Some for *Ship-Timber*; As *Oakes* that grow in *Moist Grounds*; For that maketh the *Timber* Tough, and not apt to rift with *Ordnance*; Wherein *English* and *Irish Timber* are thought to excell: Some for *Masts* of *Ships*; As *Firre* and *Pine*, because of their Length, Straightnesse, and Lightnesse: Some for *Pale*; As *Oake*: Some for *Fuell*; As *Ash*: And so of the rest.

659 The *Comming* of *Trees* and *Plants* in certaine *Regions*, and not in others, is sometimes *Casuall*: For many have beene translated, and have prospered well; As *Damaske-Roses*, that have not beene knowne in *England* above an hundred yeares, and now are so common. But the liking of *Plants* in certaine *Soiles*, more than in others, is meerely *Naturall*; As the *Firre* and *Pine* love the Mountaines; The *Poplar*, *Willow*, *Sallow*, and *Alder*, love *Rivers*, and *Moist Places*: The *Ash* loveth *Coppices*; But is best in *Standards* alone: *Iuniper* loveth *Chalke*; And so doe most *Fruit-Trees*: *Sampire* groweth but upon *Rockes*: *Reeds* and *Osiers* grow where they are washed with *Water*: The *Vine* loveth Sides of *Hills*, turning upon the *South-East-Sunne*, &c.

660 The *Putting forth* of certaine *Herbs* discovereth of what Nature the *Ground* where they put forth, is: As *Wilde Thyme* sheweth good *Feeding Ground* for *Cattell*: *Bettony* and *Strawberries* shew *Grounds* fit for Wood: *Camomill* sheweth Mellow *Grounds* fit for *Wheat*. *Mustard-Seed*, growing after the *Plough*, sheweth a good *Strong Ground* also for *Wheat*: *Burnet* sheweth good *Meadow*: And the like.

661 There are found, in divers *Countries*, some other *Plants*, that grow out of *Trees*, and *Plants*, besides *Misseltoe*: As in *Syria*, there is an *Herb* called *Cassytas*, that groweth out of tall *Trees*, and windeth it selfe about the same *Tree* where it groweth; And sometimes about *Thornes*. There is a kinde of *Polypode*, that groweth out of *Trees*, though it windeth not. So likewise an *Herbe* called *Faunos*, upon the *Wilde Olive*. And an *Herbe* called *Hippophæston* upon the *Fullers Thorne*; Which, they say, is good for the *Falling-Sicknesse*.

662 It hath bin observed, by some of the *Ancients*, that howsoever *Cold* and *Easterly Winds*, are thought to be great Enemies to *Fruit*; yet nevertheless *South-Winds* are also found to doe Hurt; Especially in the *Blossoming* time; And the more, if *Showers* follow. It seemeth, they call forth the *Moisture* too fast. The *West Winds* are the best. It hath been observed also, that *Greene* and *Open Winters* doe hurt *Trees*; Insomuch as if two or three such *Winters* come together, *Almond-Trees*, and some other *Trees*, will die. The *Cause* is the same with the former, because the *Lust* of the *Earth* overspendeth it selfe; Howsoever some other of the *Ancients* have commended *Warme Winters*.

663 *Snowes*, lying long, cause a *Fruitfull Yeare*; For first, they keepe in the *Strength* of the *Earth*; Secondly, they water the *Earth*, better than *Raine*; For in *Snow*, the *Earth* doth (as it were) sucke the *Water*, as out of the *Teat*. Thirdly, the *Moisture* of *Snow* is the finest *Moisture*; For it is the *Froth* of the *Cloudy Waters*.

664 *Showers*, if they come a little before the *Ripening* of *Fruits*, doe good to all *Succulent* and *Moist Fruits*; As *Vines*, *Olives*, *Pomegranates*; Yet it is rather for Plenty, than for Goodnesse; For the best *Wines* are in the Driest *Vintages*: *Small Showers* are likewise good for *Corne*, so as *Parching Heats* come not upon them. Generally, *Night-Showers* are better than *Day-Showers*;

Showers; For that the *Sunne* followeth not so fast upon them: and wee see, even in *Watring* by the *Hand*, it is best, in *Summer time*, to water in the *Evening*.

665 The *Differences* of *Earths*, and the *Triall* of them, are worthy to bee diligently inquired. The *Earth*, that with *Showers* doth easilliest *Soften*, is commended; And yet some *Earth* of that kinde will be very Drie, and Hard before the *Showers*. The *Earth* that casteth up from the *Plough*, a great *Clod*, is not so good, as that, which casteth up a Smaller *Clod*. The *Earth*, that putteth forth *Mosse* easily, and may be called *Mouldie*, is not good. The *Earth*, that smelleth well upon the Digging, or Ploughing, is commended; As containing the *Iuyce* of *Vegetables* almost already prepared. It is thought by some, that the *Ends* of low *Raine-bowes*, fall more upon one kinde of *Earth* than upon another: As it may well be; For that the *Earth* is most *Roscide*: And therefore it is commended for a Signe of good *Earth*. The *Poorenesse* of the *Herbs*, (it is plaine,) shew the *Poorenesse* of the *Earth*; And especially if they be in *Colour* more darke: But if the *Herbs* shew *Withered*, or *Blasted* at the Top, it sheweth the *Earth* to be very *Cold*: And so doth the *Mossinesse* of *Trees*. The *Earth*, whereof the *Grasse* is soone *Parched* with the *Sunne*, and *Toasted*, is commonly *Forced Earth*, and Barren in his owne Nature. The *Tender*, *Chessome*, and *Mellow Earth*, is the best; Being meere *Mould*, between the two Extreames of *Clay*, and *Sand*; Especially if it be not *Loamy*, and *Binding*. The *Earth*, that after *Raine*, will scarce be *Ploughed*, is commonly *Fruitfull*; For it is *Cleaving*, and full of *Iuyce*.

666 It is strange, which is observed by some of the *Ancients*, that *Dust* helpeth the *Fruitfulnesse* of *Trees*; and of *Vines*, by name: Insomuch as they cast Dust upon them of purpose. It should seeme, that that Powdring, when a Shower commeth, maketh a kinde of Soyling to the *Tree*, being *Earth* and *Water*, finely laid on. And they note, that Countries, where the *Fields* and *Wayes* are *Dusty*, beare the best *Vines*.

667 It is commended by the *Ancients*, for an Excellent *Helpe* to *Trees*, to lay the *Stalkes*, and *Leaves* of *Lupines* about the *Roots*; Or to Plough them into the *Ground*, where you will sow *Corne*. The *Burning* also of the *Cuttings* of *Vines*, and *Casting* them upon *land*, doth much Good. And it was generally received of old, that *Dunging* of *Grounds*, when the *West Winde* bloweth, and in the *Decrease* of the *Moone*, doth greatly helpe; The *Earth* (as it seemeth) being then more thirsty, and open, to receive the *Dung*.

668 The *Grafting* of *Vines* upon *Vines*, (as I take it,) is not now in use: The *Ancients* had it, and that three wayes: The first was *Insition*, which is the Ordinary manner of *Grafting*: The Second was *Terebration*, through the *Middle* of the *Stocke*, and putting in the *Cions* there: And the Third was Paring of two *Vines*, that grow together, to the *Marrow*, and Binding them close.

669 The *Diseases* and ill *Accidents* of *Corne*, are worthy to be enquired; And would be more worthy to be enquired, if it were in Mens Power to helpe them; Whereas many of them are not to be remedied. The *Mill-dew* is one of the Greatest; which (out of question) commeth by *Closenesse* of *Aire*; And therefore in *Hills*, or large *Champaigne Grounds*, it seldome commeth; Such as is with us *York's Woald*. This cannot bee remedied, otherwise than that in *Countries* of small Enclosure, the *Grounds* bee turned into larger *Fields*: Which I have knowne to doe good in some Farmes. Another *Disease* is the *Putting forth* of *Wilde Oates*, whereinto *Corne* oftentimes, (especially *Barley*,) doth degenerate. It happeneth chiefly from the

the *Weakneſſe* of the *Graine* that is ſowen; For if it bee either too Old, or Mouldy, it will bring forth *Wilde Oats*. Another *Diſeaſe* is the *Sacietie* of the *Ground*; For if you ſow one *Ground* ſtill with the ſame *Corne*, (I meane not the ſame *Corne* that grew upon the ſame *Ground*;) but the ſame *Kinde* of *Graine*; (As *Wheat*, *Barley*, &c.) it will proſper but poorely: Therefore beſides the *Reſting* of the *Ground*, you muſt vary the *Seed*. Another ill *Accident* is, from the *Winds*, which hurt at two times; At the *Flowring*, by *shaking* off the *Flowers*; And at the full *Ripening*, by *Shaking* out the *Corne*. Another ill *Accident* is, *Drouth*, at the *Spindling* of the *Corne*; Which with us is rare; But in Hotter *Countries*, common: Inſomuch as the Word, *Calamitas*, was firſt derived from *Calamus*, when the *Corne* could not get out of the *Stalke*. Another ill *Accident* is, *Over-wet* at *Sowing-Time*; which with us breedeth much *Dearth*; Inſomuch as the *Corne* never commeth up; And (many times) they are forced to reſow *Sommer-Corne*, where they ſowed *Winter-Corne*. Another ill *Accident* is *Bitter Froſts*, continued, without *Snow*; Eſpecially in the Beginning of the *Winter*, after the *Seed* is new Sowen. Another *Diſeaſe* is *Wormes*; which ſometimes breed in the *Root*, and happen upon Hot *Sunnes*, and *Showres*, immediately after the *Sowing*; And another *Worme* breedeth in the *Eare* it Selfe; Eſpecially when *Hot Sunnes* breake often out of *Clouds*. Another *Diſeaſe* is *Weeds*; And they are ſuch, as either Choak, and Over-ſhadow the *Corne*, and beare it downe; Or ſtarve the *Corne*, and deceive it of Nouriſhment. Another *Diſeaſe* is, *Over-Rankneſſe* of the *Corne*; Which they uſe to remedy, by *Mowing it* after it is come up; Or putting *Sheepe* into it. Another ill *Accident* is *Laying* of *Corne* with great *Raines*, neare, or in *Harveſt*. Another ill *Accident* is, if the *Seed* happen to have touched *Oyle*, or any *Thing*, that is *Fat*; For thoſe *Subſtances* have an *Antipathy* with *Nouriſhment* of *Water*.

670 The *Remedies* of the *Diſeaſes* of *Corne* have beene obſerved as followeth. The *Steeping* of the *Graine*, before *Sowing*, a little time in *Wine*, is thought a *Preſervative*: The *Mingling* of *Seed-Corne* with *Aſhes*, is thought to be good: The *Sowing* at the *Wane* of the *Moone*, is thought to make the *Corne* ſound: It hath not beene practiſed, but it is thought to bee of uſe, to make ſome *Miſſellane* in *Corne*; As if you ſow a few *Beanes* with *Wheat*, your *Wheat* will be the bettet. It hath beene obſerved, that the *Sowing* of *Corne* with *Houſleeke*, doth good. Though *Graine*, that toucheth *Oyle*, or *Fat*, receiveth hurt, yet the *Steeping* of it, in the *Dregs* of *Oyle*, when it beginneth to Putrifie, (which they call *Amurca*,) is thought to aſſure it againſt *Wormes*. It is reported alſo, that if *Corne* bee *Mowed*, it will make the *Graine* Longer, but Emptier, and having more of the *Huske*.

671 It hath beene noted, that *Seed* of a yeare old, is the Beſt; And of two or three yeares is worſe; And that which is more Old, is quite Barren; Though (no doubt) ſome *Seed* and *Graines* laſt better than others. The *Corne*, which in the *Vanning* lieth loweſt, is the beſt: And the *Corne*, which broken or bitten retaineth a little *Yellowneſſe*, is better than that which is very *White*.

672 It hath beene obſerved, that of all *Roots* of *Herbs*, the *Root* of *Sorrell* goeth the furtheſt into the *Earth*; Inſomuch as it hath beene knowne to goe three Cubits deep; And that it is the *Root* that continueth fit (longeſt) to be ſet againe, of any *Root* that groweth. It is a *Cold*, and *Acide Herb*, that (as it ſeemeth) loveth the *Earth*, and is not much drawne by the *Sunne*.

673 It hath beene obſerved, that ſome *Herbs* like beſt, being watred with *Salt-Water*; And *Radiſh*, *Beet*, *Rew*, *Pennyroyall*; This Triall would be extended

to some other *Herbs*; Especially such as are Strong; As *Tarragon*, *Mustard-Seed*, *Rocket*, and the like.

674 It is strange that is generally received, how some *Poysonous Beasts* affect *Odorate* and *Wholsome Herbs*; As that the *Snake* loveth *Fennell*; That the *Toad* will be much under *Sage*; That *Frogs* will be in *Cinquefoile*. It may be, it is rather the *Shade*, or other Coverture, that they take liking in, than the Vertue of the *Herb*.

675 It were a Matter of great Profit, (save that I doubt it is too Conjecturall to venture upon,) if one could discerne, what *Corne*, *Herbs*, or *Fruits*, are like to be in *Plenty*, or *Scarcity*, by some *Signes* and *Prognosticks*, in the Beginning of the Yeare: For as for those, that are like to be in *Plenty*, they may be bargained for, upon the *Ground*; As the Old Relation was of *Thales*; who to shew how easie it was for a *Philosopher* to be rich, when he fore-saw a great *Plenty* of *Olives*, made a *Monopoly* of them. And for *Scarcitie*, Men may make Profit in keeping better the Old Store. Long *Continuance* of *Snow* is beleeved to make a *Fruitfull Year* of *Corn*: An *Early Winter*, or a very *Late Winter*, a *Barren Yeare* of *Corne*: An Open and Serene *Winter*, an ill Yeare of *Fruit*: These we have partly touched before: But other *Prognosticks* of like Nature are diligently to be enquired.

676 There seeme to be, in some *Plants*, *Singularities*, wherein they differ from all Other; The *Olive* hath the *Oyly Part*, onely on the *Outside*; Whereas all other *Fruits* have it in the *Nut*, or *Kernell*. The *Firre* hath (in effect) no *Stone*, *Nut*, nor *Kernell*; Except you will count the little *Graines Kernells*. The *Pomegranate* and *Pine-Apple* have onely, amongst *Fruits*, *Graines* distinct in severall *Cells*. No *Herbs* have *Curled Leaves*, but *Cabbage*, and *Cabbage-Lettuce*. None have double *Leaves*, one belonging to the *Stalk*, another to the *Fruit* or *Seed*, but the *Artichoke*: No *Flower* hath that kind of Spread that the *Woodbine* hath. This may be a large Field of Contemplation; For it sheweth that in the Frame of *Nature*, there is, in the Producing of some *Species*, a Composition of Matter, which happeneth oft, and may be much diversified: In others, such as happeneth rarely, and admitteth little Variety: for so it is likewise in *Beasts*: *Dogs* have a Resemblance with *Wolves*, and *Foxes*; *Horses* with *Asses*; *Kine* with *Buffles*; *Hares* with *Coneys*; &c. And so in *Birds*: *Kites* and *Kestrels* have a Resemblance with *Hawkes*; *Common-Doves* with *Ring-Doves*, and *Turtles*; *Black Birds* with *Thrushes*, and *Mavisses*; *Crowes* with *Ravens*, *Dawes*, and *Choughes*, &c. But *Elephants*, and *Swine* amongst *Beasts*; And the *Bird* of *Paradise*, and the *Peacocke* amongst *Birds*; And some few others; have scarce any other *Species*, that have Affinity with them.

Wee leave the *Description* of *Plants*, and their *Vertues*, to *Herballs*, and other like *Bookes* of *Naturall History*: Wherein *Mens Diligence* hath beene great, even to *Curiositie*: For our *Experiments* are onely such, as doe ever ascend a Degree to the *Deriving* of *Causes*, and *Extracting* of *Axiomes*, which, we are not ignorant, but that some, both of the *Ancient*, and *Moderne Writers*, have also laboured; But their *Causes*, and *Axiomes*, are so full of Imagination, and so infected with the old Received *Theories*, as they are meere *Inquinations* of *Experience*, and Concoct it not.

It

IT hath beene observed, by some of the *Ancients*, that *Skins*, (especially of *Rammes*,) newly pulled off, and applyed to the *Wounds* of *Stripes*, doe keepe them from Swelling, and Exulcerating; And likewise Heale them, and Close them up; And that the *Whites* of *Egges* doe the same. The *Cause* is a Temperate *Conglutination*; For both *Bodies* are Clammy, and Viscous, and doe bridle the *Defluxe* of *Humours* to the Hurts, without Penning them in too much.

Experiment Solitary, touching *Healing* of *Wounds*. 677

YOu may turne (almost) all *Flesh* into a *Fatty Substance*, if you take *Flesh*, and cut it into Peeces, and put the Peeces into a *Glasse* covered with Parchment; And so let the *Glasse* stand six or seven Houres in *Boyling Water*. It may bee an *Experiment* of Profit, for Making of *Fat*, or *Grease*, for many uses; But then it must be of such *Flesh* as is not Edible; As *Horses*, *Dogs*, *Beares*, *Foxes*, *Badgers*, &c.

Experiment Solitary touching *Fat diffused* in *Flesh*. 678

IT is reported by one of the *Ancients*, that *New Wine*, put into *Vessels* well stopped, and the *Vessells* let downe into the *Sea*, will accelerate very much, The Making of them Ripe, and Potable. The same would be tried in *Wort*.

Experiment Solitary, touching *Ripening* of *Drinke* before the *Time*. 679

BEasts are more *Hairy* than *Men*; And *Savage Men* more than *Civill*; And the *Plumage* of *Birds* exceedeth the *Pilositie* of *Beasts*. The *Cause* of the Smoothnesse in *Men*, is not any Abundance of *Heat*, and *Moisture*, though that indeed causeth *Pilositie*; But there is requisite to *Pilosity*, not so much *Heat* and *Moisture*, as *Excrementitious Heat* and *Moisture*: (For whatsoever assimilateth, goeth not into the *Haire*:) And *Excrementitious Moisture* aboundeth most in *Beasts*, and *Men* that are more *Savage*. Much the same Reason is there of the *Plumage* of *Birds*; For *Birds* assimilate lesse, and excerne more than *Beasts*: for their *Excrements* are ever liquid, and their *Flesh* (generally) more drie: Beside, they have not *Instruments* for *Vrine*, And so all the *Excrementitious Moysture* goeth into the *Feathers*: And therefore it is no Marvell, though *Birds* bee commonly better Meat than *Beasts*, because their *Flesh* doth assimilate more finely, and secerneth more subtilly. Againe, the *Head* of *Man* hath *Haire* upon the *first Birth*, which no other *Part* of the *Body* hath. The *Cause* may be *Want* of *Perspiration*: For Much of the Matter of *Haire*, in the other *Parts* of the *Body*, goeth forth by Insensible *Perspiration*; And besides, the *Skull* being of a more solide Substance, nourisheth and assimilateth lesse, and excerneth more: And so likewise doth the *Chinne*; We see also that *Haire* commeth not upon the *Palmes* of the *Hands*, nor *Soales* of the *Feet*; Which are *Parts* more *Perspirable*. And *Children* likewise are not *Hairy*, for that their *Skins* are more *Perspirable*.

Experiment Solitary, touching the *Quicknesse* of *Motion* in *Birds*. 680

Experiment Solitary touching *Pilosity* and *Plumage*. 680

BIrds are of *Swifter Motion* than *Beasts*: For the *Flight* of many *Birds* is *Swifter*, than the *Race* of any *Beasts*. The *Cause* is, for that the *Spirits* in *Birds*, are in greater Proportion, in comparison of the Bulke of their Body, than in *Beasts*: For as for the Reason that some give, that they are partly Carried, whereas *Beasts* goe, that is Nothing; For by that Reason Swimming should be swifter, than Running: And that Kinde of *Carriage* also, is not without Labour of the *Wing*.

Experiments Solitary, touching the *Quicknesse* of *Motion* in *Birds*. 681

THe *Sea* is *Clearer*, when the *North-Wind* bloweth, than when the *South-Wind*. The *Cause* is, for that *Salt-Water* hath a little *Oylinesse* in the *Surface* thereof; As appeareth in very Hot Dayes: And againe, for that the *Southerne*

Experiment Solitary, touching the different *Clearenesse* of the *Sea*. 682

Southerne Wind relaxeth the *Water* somewhat; As no *Water Boyling* is so Cleare as *Cold Water*.

Experiment Solitary, touching the different *Heats* of *Fire* and *Boyling Water*. 683

FIre burneth *Wood*, making it first *Luminous*; Then *Black* and *Brittle*; And lastly, *Broken* and *Incinerate*: *Scalding Water* doth none of these. The *Cause* is, for that by *Fire*, the *Spirit* of the *Body* is first *Refined*, and then *Emitted*; Whereof the *Refining*, or Attenuation causeth the *Light*; And the *Emission*, first the *Fragilitie*, and after the *Dissolution* into *Ashes*: Neither doth any other *Body* enter: But in *Water* the *Spirit* of the *Body* is not *Refined* so much; And besides Part of the *Water* entreth; Which doth increase the *Spirit*, and in a degree extinguish it: Therefore wee see that *Hot Water* will quench *Fire*. And againe we see, that in *Bodies*, wherein the *Water* doth not much enter, but onely the *Heat* passeth, *Hot Water* worketh the Effects of *Fire*: As in *Egges Boyled*, and *Roasted*, (into which the *Water* entreth not at all,) there is scarce difference to be discerned; But in *Fruit*, and *Flesh*, whereinto the *Water* entreth, in some Part, there is much more difference.

Experiment Solitary, touching the *Qualification* of *Heat* by *Moisture*. 684

THe *Bottome* of a *Vessell* of *Boyling Water*, (as hath beene observed,) is not very much *Heated*, So as Men may put their *Hand* under the *Vessel*, and remove it. The *Cause* is, for that the *Moisture* of *Water*, as it quencheth Coales, where it entreth; So it doth allay Heat, where it toucheth: And therefore note well, that *Moisture*, although it doth not passe thorow *Bodies*, without *Communication* of some *Substance*, (As *Heat* and *Cold* doe;) yet it worketh manifest Effects; not by Entrance of the Body, but by Qualifying of the Heat, and Cold; As we see in this *Instance*: And we see likewise, that the *Water* of *Things distilled* in *Water*, (which they call the *Bath*) differeth not much from the *Water* of *Things Distilled* by *Fire*: We see also, that *Pewter-Dishes*, with *Water* in them, will not Melt easily; But without it, they will; Nay we see more, that *Butter*, or *Oile*, which in themselves are Inflammable, yet by the Vertue of their *Moisture*; will doe the like.

Experiment Solitary, touching *Yawning*. 685

IT hath beene noted by the *Ancients*, that it is dangerous to Picke ones *Eare*, whilest he *Yawneth*. The *Cause* is, for that in *Yawning*, the Inner *Parchment* of the *Eare* is extended, by the *Drawing* in of the *Spirit*, and *Breath*; For in *Yawning*, and *Sighing* both, the *Spirit* is first strongly Drawne in, and then strongly Expelled.

Experiment Solitary, touching the *Hiccough*. 686

IT hath beene observed by the *Ancients*, that *Sneezing* doth cease the *Hiccough*. The *Cause* is, for that the *Motion* of the *Hiccough* is a *Lifting up* of the *Stomacke*; which *Sneezing* doth somewhat depresse, and divert the *Motion* another way. For first we see, that the *Hiccough* commeth of *Fulnesse* of *Meat*, (especially in *Children*,) which causeth an Extension of the *Stomacke*: Wee see also, it is caused by *Acide Meats*, or *Drinkes*, which is by the *Pricking* of the *Stomack*: And this *Motion* is ceased either by *Diversion*; Or by *Detention* of the *Spirits*: *Diversion*, as in *Sneezing*; *Detention*, as wee see *Holding* of the *Breath*, doth helpe somewhat to cease the *Hiccough*: And putting a Man into an Earnest Study doth the like: As is commonly used: And *Vinegar* put to the *Nostrils*, or *Gargarized*, doth it also; For that it is *Astringent*, and inhibiteth the *Motion* of the *Spirit*.

Experiment Solitary, touching *Sneezing*. 687

LOoking against the *Sunne*, doth induce *Sneezing*. The *Cause* is, not the *Heating* of the *Nostrils*; For then the holding up of the *Nostrils* against the

the *Sunne*, though one Winke, would doe it; But the *Drawing* downe of the *Moisture* of the *Brain*: For it will make the *Eyes* runne with *Water*; And the *Drawing* of *Moisture* to the *Eyes*, doth draw it to the *Nosthrills*, by *Motion* of *Consent*; And so followeth *Sneezing*; As contrariwise, the *Tickling* of the *Nosthrills* within, doth draw the *Moisture* to the *Nosthrils*, and to the *Eyes* by *Consent*; For they also will *Water*. But yet, it hath beene observed, that if one be about to *Sneeze*, the Rubbing of the *Eyes*, till they runne with Water, will prevent it. Whereof the *Cause* is, for that the *Humour*, which was descending to the *Nosthrils*, is diverted to the *Eyes*.

Experiment Solitary, touching the *Tendernesse* of the *Teeth*. 688

THe *Teeth* are more, by *Cold Drinke*, or the like, affected, than the other *Parts*. The *Cause* is double, The One, for that the *Resistance* of *Bone* to *Cold*, is greater than of *Flesh*; for that the *Flesh* shrinketh, but the *Bone* resisteth, whereby the *Cold* becommeth more eager: The Other is, for that the *Teeth*, are *Parts* without *Bloud*; Whereas *Bloud* helpeth to qualifie the *Cold*: And therefore we see, that the *Sinewes* are much affected with *Cold*; For that they are *Parts* without *Bloud*: So the *Bones* in Sharpe *Colds* waxe *Brittle*: And therefore it hath been seene, that all *Contusions* of *Bones*, in *Hard Weather*, are more difficult to Cure.

Experiments Solitary, touching the *Tongue*. 689

IT hath beene noted, that the *Tongue* receiveth, more easily, *Tokens* of *Diseases*, than the other *Parts*; As of *Heats* within, which appeare most in the *Blacknesse* of the *Tongue*. Againe, *Pied Cattell* are spotted in their *Tongues*, &c. The *Cause* is, (no doubt,) the *Tendernesse* of the *Part*, which thereby receiveth more easily all *Alterations*, than any other *Parts* of the *Flesh*.

Experiment Solitary touching the *Taste*. 690

WHen the *Mouth* is out of *Taste*, it maketh Things taste, sometimes *Salt*; Chiefely *Bitter*; And sometimes *Loathsome*; But never *Sweet*. The *Cause* is, the *Corrupting* of the *Moisture* about the *Tongue*; Which many times turneth *Bitter*, and *Salt*, and *Loathsome*; But *Sweet* never; For the rest are *Degrees* of *Corruption*.

Experiment Solitary, touching some *Prognosticks* of *Pestilentiall Seasons*. 691

IT was observed in the *Great Plague* of the last Yeare, that there were seene, in divers *Ditches*, and low *Grounds*, about *London*, many *Toads*, that had *Tailes*, two or three Inches long, at the least; Whereas *Toads* (usually) have no *Tailes* at all. Which argueth a great Disposition to *Putrefaction* in the *Soile* and *Aire*. It is reported likewise, that *Roots*, (such as *Carrets*, and *Parsnips*,) are more *Sweet*, and *Lushious*, in Infectious Yeares, than in other Yeares.

Experiment Solitary, touching *Speciall Simples* for *Medicines*. 692

WIse *Physitians* should with all diligence inquire, what *Simples* Nature yeeldeth, that have extreme *Subtile Parts*, without any *Mordication*, or *Acrimony*: For they undermine that which is *Hard*; They open that which is *Stopped*, and *Shut*; And they expell that which is *Offensive*, gently, without too much *Perturbation*. Of this Kind are *Elder-Flowers*, which therefore are Proper for the *Stone*: Of this Kinde is the *Dwarfe-Pine*; which is Proper for the *Iaundies*: Of this Kinde is *Harts-Horne*: which is Proper for *Agues*, and *Infections*: Of this Kinde is *Piony*; which is Proper for *Stoppings* in the *Head*: Of this Kinde is *Fumitory*; which is Proper for the *Spleen*: And a Number of others. Generally, divers *Creatures* bred of *Putrefaction*, though they be somewhat loathsome to take, are of this kinde; As *Earth-Wormes*, *Timber-Sowes*, *Snailes*, &c. And I conceive, that the *Trochischs* of *Vipers*, (which are so much magnified,) and the *Flesh* of *Snakes* some wayes condited,

condited, and corrected, (which of late are growne into some Credite,) are of the same Nature. So the *Parts* of *Beasts Putrified*; (as *Castoreum*, and *Musk*, which have extreme *Subtill Parts*,) are to be placed amongst them. We see also that *Putrefaction* of *Plants*, (as *Agaricke*, and *Iewes-Eare*,) are of greatest Vertue. The *Cause* is, for that *Putrefaction* is the Subtilest of all *Motions*, in the *Parts* of *Bodies*: And since we cannot take downe the *Lives* of *Living Creatures*, (which some of the *Paracelsians* say (if they could bee taken downe,) would make us *Immortall*;) the Next is for *Subtiltie* of *Operation*, to take *Bodies Putrefied*; Such as may be safely taken.

Experiments in Consort, touching *Venus*.

693 It hath beene observed by the *Ancients*, that *Much Vse* of *Venus* doth *Dim* the *Sight*; And yet *Eunuchs*, which are unable to generate are (nevertheless) also *Dimme-Sighted*. The *Cause* of *Dimnesse* of *Sight*, in the Former, is the *Expence* of *Spirits*: In the Later, the *Over-moisture* of the *Braine*: For the *Over-Moisture* of the *Braine* doth thicken the *Spirits Visuall*, and obstructeth their Passages; As we see by the Decay, in the *Sight*, in *Age*; Where also the *Diminution* of the *Spirits* concurreth as another *Cause*: wee see also that *Blindnesse* commeth by *Rheumes*, and *Cataracts*. Now in *Eunuchs*, there are all the Notes of *Moisture*; As the Swelling of their Thighes, the Loosenesse of their Belly, the Smoothnesse of their Skinne, &c.

694 The *Pleasure* in the *Act* of *Venus*, is the greatest of the *Pleasures* of the *Senses*; The Matching of it with *Itch* is unproper; though that also be Pleasing to the touch. But the *Causes* are Profound. First, all the *Organs* of the *Senses* qualifie the *Motions* of the *Spirits*; And make so many Severall *Species* of *Motions*, and *Pleasures* or *Displeasures* thereupon, as there be *Diversities* of *Organs*. The *Instruments* of *Sight*, *Hearing*, *Taste*, and *Smell*, are of severall frame; And so are the Parts for Generation. Therefore *Scaliger* doth well, to make the *Pleasure* of *Generation* a *Sixth Sense*; And if there were any other differing *Organs*, & Qualified *Perforations*, for the *Spirits* to passe; there would be more than the *Five Senses*: Neither doe wee well know, whether some *Beasts* and *Birds*, have not *Senses* that we know not; And the very *Sent* of *Dogs* is almost a *Sense* by it selfe. Secondly, the *Pleasures* of the *Touch*, are greater and deeper, than those of the other *Senses*; As we see in *Warming* upon *Cold*; Or *Refrigeration* upon *Heat*: For as the *Paines* of the *Touch*, are greater than the *Offences* of other *Senses*; So likewise are the *Pleasures*. It is true, that the *Affecting* of the *Spirits immediately*, and (as it were) without an *Organ*, is of the greatest *Pleasure*; Which is but in two things: *Sweet Smells*; And *Wine*, and the like *Sweet Vapours*. For *Smells*, we see their great and sudden Effect in fetching *Men* againe, when they swoune: For *Drinke*, it is certaine, that the *Pleasure* of *Drunkennesse*, is next the *Pleasure* of *Venus*: And *Great Ioyes* (likewise) make the *Spirits* move, and touch themselves: And the *Pleasure* of *Venus* is somewhat of the same Kinde.

695 It hath been alwayes observed, that *Men* are more inclined to *Venus* in the *Winter*, and *Women* in the *Summer*. The *Cause* is, for that the *Spirits*, in a *Body* more Hot and Drie, (as the *Spirits* of *Men* are,) by the *Summer* are more exhaled, and dissipated; And in the *Winter* more condensed, and kept entire: But in *Bodies* that are Cold and Moist, (as *Womens* are,) the *Summer* doth Cherish the *Spirits*, and calleth them forth; the *Winter* doth dull them. Furthermore, the *Abstinence*, or *Intermission* of the use of *Venus*, in *Moist* and *well habituate Bodies*, breedeth a *Number* of *Diseases*; And especially dangerous *Impostumations*. The Reason is evident; For that it is a Principall *Evacuation*, especially of the *Spirits*: For of the *Spirits*, there is scarce any *Evacuation*, but

but in *Venus*, and *Exercise*. And therefore the *Omission* of either of them, breedeth all *Diseases* of *Repletion*.

The *Nature* of *Vivification* is very worthy the Enquiry: And as the *Nature* of *Things*, is commonly better perceived, in Smal, than in Great; and in unperfect, than in perfect; and in Parts, than in whole: So the *Nature* of *Vivification* is best enquired in *Creatures* bred of *Putrefaction*. The *Contemplation* whereof hath many *Excellent Fruits*. First, in *Disclosing* the *Originall* of *Vivification*. Secondly, in *Disclosing* the *Originall* of *Figuration*. Thirdly, in *Disclosing* many *Things* in the *Nature* of *Perfect Creatures*, which in them lie more hidden. And Fourthly, in *Traducing*, by way of *Operation*, some *Observations* in the *Insecta*, to work *Effects* upon *Perfect Creatures*. Note that the word *Insecta* agreeth not with the Matter, but we ever use it for Brevities sake, intending by it *Creatures bred of Putrefaction*. Experiments in Consort, touching the *Insecta*.

The *Insecta* are found to breed out of severall *Matters*: Some breed of *Mud*, or *Dung*; As the *Earth-wormes*, *Eeles*, *Snakes*, &c. For they are both *Putrefactions*: For *Water* in *Mud* doth Putrifie, as not able to Preserve it self: And for *Dung*, all *Excrements* are the *Refuse* and *Putrefactions* of *Nourishment*. Some breed in *Wood*, both Growing, and Cut downe. *Quære* in what *Woods* most, and at what Seasons? We see that the *Wormes* with many Feet, which round themselves into Balls, are bred chiefly under *Logs* of *Timber*, but not in the *Timber*; And they are said to bee found also, (many times,) in *Gardens*, where no *Logs* are. But it seemeth their *Generation* requireth a *Coverture*, both from *Sunne*, and *Raine*, or *Dew*; As the *Timber* is; And therefore they are not *Venomous*, but (contrariwise) are held by the *Physitians* to clarifie the *Bloud*. It is observed also that *Cimices* are found in the *Holes* of *Bed-Sides*. Some breed in the *Haire* of *Living Creatures*; As *Lice*, and *Tikes*; which are bred by the *Sweat* close kept, and somewhat arefied by the *Haire*. The *Excrements* of *Living Creatures*, doe not onely breed *Insecta*, when they are Excerned, but also while they are in the *Body*; As in *Wormes* whereto Children are most subject, and are chiefly in the Guts. And it hath beene lately observed by *Physitians*, that in many *Pestilent Diseases*, there are *Wormes* found in the upper Parts of the Body, where *Excrements* are not, but onely *Humours Putrified*. *Fleas* breed principally of *Straw* or *Mats*, where there hath beene a little *Moisture*; Or the *Chamber* and *Bed-straw* kept close, and not Aired. It is received that they are killed by Strewing *Worme-wood* in the *Rooms*. And it is truely observed, that *Bitter Things* are apt, rather to kill, than engender *Putrefaction*; And they be *Things* that are *Fat*, or *Sweet*, that are aptest to *Putrifie*. There is a *Worme*, that breedeth in *Meale*, of the shape of a large white *Maggot*, which is given as a great dainty to *Nightingales*. The *Moath* breedeth upon *Cloth*, and other *Lanifices*; Especially if they be laid up dankish, and wet. It delighteth to be about the *Flame* of a *Candle*. There is a *Worme* called a *Wevill*, bred under *Ground*, and that feedeth upon *Roots*; As *Parsnips*, *Carrets*, &c. Some breed in *Waters*, especially shaded, but they must be *Standing Waters*; As the *Water-Spider*, that hath six Legs. The *Flie* called the *Gad-flie*, breedeth of somewhat that Swimmeth upon the Top of the *Water*, and is most about *Ponds*. There is a *Worme* that breedeth of the *Dregs* 696

of

of *Wine Decayed*; which afterwards, (as is observed by some of the *Ancients*,) turneth into a *Gnat*. It hath beene observed by the *Ancients*, that there is a *Worme* that breedeth in old *Snow*, and is of Colour Reddish, and dull of Motion, and dyeth soone after it commeth out of *Snow*. Which should shew, that *Snow* hath in it a secret *Warmth*; For else it could hardly Vivifie. And the Reason of the Dying of the *Worme*, may be the sudden Exhaling of that little *Spirit*, as soon as it commeth out of the *Cold*, which had shut it in. For as *Butterflies* quicken with *Heat*, which were benummed with *Cold*; So *Spirits* may exhale with *Heat*, which were Preserved in *Cold*. It is affirmed both by the *Ancient* and *Moderne Observation*, that in *Furnaces* of *Copper*, and *Brasse*, where *Chalcites*, (which is *Vitrioll*,) is often cast in, to mend the working, there riseth suddenly a *Flie*, which sometimes moveth, as if it tooke hold on the walls of the *Furnace*; Sometimes is seene moving in the *Fire* below; And dieth presently, as soone as it is out of the *Furnace*. Which is a Noble *Instance*, and worthy to be weighed; for it sheweth that as well *Violent Heat* of *Fire*, as the *Gentle Heat* of *Living Creatures*, will Vivifie, if it have Matter Proportionable. Now the great *Axiome* of *Vivification* is, that there must bee *Heat* to dilate the *Spirit* of the *Body*; An *Active Spirit* to be dilated; *Matter Viscous* or *Tenacious*, to hold in the *Spirit*; And that *Matter* to be *put forth*, and *Figured*. Now a *Spirit* dilated by so ardent a *Fire*, as that of the *Furnace*, as soone as ever it cooleth never so little, congealeth presently. And (no doubt) this *Action* is furthered by the *Chalcites*, which hath a *Spirit*, that will put forth and germinate, as we see in *Chymicall* Trials. Briefly, most *Things Putrified* bring forth *Insecta* of severall Names; But wee will not take upon us now, to Enumerate them all.

697 The *Insecta* have been noted by the *Ancients*, to feed little: But this hath not beene diligently observed; For *Grashoppers* eat up the *Greene* of whole *Countries*; And *Silke-Wormes* devoure *Leaves* swiftly; And *Ants* make great Provision. It is true, that *Creatures*, that Sleep and rest much, Eat little; As *Dormise*, and *Bats*, &c. They are all without *Bloud*: Which may be, for that the *Iuyce* of their *Bodies*, is almost all one; Not *Bloud*, and *Flesh*, and *Skin*, and *Bone*, as in *Perfect Creatures*; The *Integrall Parts* have Extreme Varietie, but the *Similar Parts* little. It is true, that they have, (some of them,) a *Diaphragme*, and an *Intestine*; And they have all *Skins*; Which in most of the *Insecta* are cast often. They are not (generally) of *long Life*: Yet *Bees* have beene knowne to live seven yeares: And *Snakes* are thought, the rather for the *Casting* of their *Spoile*, to live till they be Old: And *Eeles*, which many times breed of *Putrefaction*, will live and grow very long: And those that Enterchange from *Wormes* to *Flies* in the *Summer*, and from *Flies* to *Wormes* in the *Winter*, have been kept in Boxes foure yeares at the least. Yet there are certaine *Flyes*, that are called *Ephemera*, that live but a day. The *Cause* is, the Exilitie of the *Spirit*; Or perhaps the Absence of the *Sunne*; For that if they were brought in, or kept close, they might live longer. Many of the *Insecta*, (as *Butterflies*, and other *Flies*,) revive easily, when they seeme dead, being brought to the *Sunne*, or *Fire*. The *Cause* whereof is, the *Diffusion* of the *Vitall Spirit*, and the easie dilating of it by a little *Heat*. They stirre a good while, after their *Heads* are off, or that they be cut in Peeces; Which is caused also, for that their *Vitall Spirits* are more diffused thorow-out all their *Parts*, and lesse confined to *Organs*, than in *Perfect Creatures*.

698 The *Insecta* have *Voluntarie Motion*, and therefore *Imagination*; And whereas some of the *Ancients* have said, that their *Motion* is Indeterminate, and their *Imagination* Indefinite, it is negligently observed; For *Ants* goe right forwards

forwards to their Hills; And *Bees* doe (admirably) know the way, from a Flowrie Heath, two or thee Miles off, to their Hives. It may be, *Gnats*, and *Flies*, have their *Imagination* more mutable, and giddy, as *Small Birds* likewise have. It is said by some of the *Ancients*, that they have onely the *Sense* of *Feeling*; which is manifestly untrue; For if they goe forth-right to a Place, they must needs have Sight: Besides, they delight more in one *Flower*, or *Herb*, than in another, and therefore have *Taste*: And *Bees* are called with *Sound* upon *Brasse*, and therefore they have *Hearing*: Which sheweth likewise that though their *Spirit* be diffused, yet there is a *Seat* of their *Senses* in their *Head*.

Other Observations *concerning the* Insecta, *together with the* Enumeration *of them, we referre to that place, where we meane to handle the* Title *of* Animal's *in generall.*

A *Man Leapeth* better with *Weights*, in his *Hands*, than without. The *Cause* is, for that the *Weight*, (if it bee proportionable,) strengtheneth the *Sinewes*, by *Contracting* them. For otherwise, where no *Contraction* is needfull, *Weight* hindreth. As we see in *Horse-Races*, *Men* are curious to fore-see, that there be not the least *Weight*, upon the one *Horse*, more than upon the other. In *Leaping* with *Weights*, the *Armes* are first cast backwards, and then forwards, with so much the greater Force: For the *Hands* goe backward before they take their Raise. *Quære*, if the contrary *Motion* of the *Spirits*, immediately before the *Motion* we intend, doth not cause the *Spirits*, as it were to breake forth with more Force: As *Breath* also drawne, and kept in, commeth forth more forcibly: And in *Casting* of any *Thing*, the *Armes*, to make a greater Swing, are first cast backward.

Experiment Solitary, touching *Leaping*. 696

OF *Musicall Tones*, and *Vnequall Sounds*, wee have spoken before; But touching the *Pleasure*, and *Displeasure* of the *Senses*, not so fully. *Harsh Sounds*, as of a *Saw*, when it is sharpened; *Grinding* of one *Stone* against another; *Squeaking*, or *Skriching Noise*; make a *Shivering* or *Horrour* in the *Bodie*, and set the *Teeth* on edge. The *Cause* is, for that the *Objects* of the *Eare*, do affect the *Spirits* (immediately) most with *Pleasure* and Offence. We see, there is no *Colour* that affecteth the *Eye* much with *Displeasure*: There bee *Sights*, that are *Horrible*, because they excite the *Memory* of *Things* that are *Odious*, or *Fearfull*; But the same *Things Painted* do little affect. As for *Smells*, *Tastes*, and *Touches*, they be *Things* that doe affect, by a *Participation*, or *Impulsion* of the *Body*, of the *Object*. So it is *Sound* alone, that doth immediately, and incorporeally affect most: This is most manifest in *Musicke*; and *Concords* and *Discords* in *Musicke*: For all *Sounds*, whether they be sharp, or Flat, if they be Sweet, have a Roundnesse and *Equality*; And if they be Harsh, are *Vnequall*: For a *Discord* it selfe is but a *Harshnesse* of *Divers Sounds Meeting*. It is true, that *Inequality*, not Stayed upon, but Passing, is rather an Encrease of *Sweetnesse*; As in the *Purling* of a *Wreathed String*; And in the *Raucity* of a *Trumpet*; And in the *Nightinghale-Pipe* of a *Regall*; And in a *Discord* straight falling upon a *Concord*: But if you stay upon it, it is *Offensive*; And therefore, there be these three *Degrees* of *Pleasing*, and *Displeasing* in *Sounds*; *Sweet Sounds*; *Discords*; and *Harsh Sounds*, which we call by divers Names, as *Skriching*, or *Grating*, such as wee now speake of. As for the *Setting* of the *Teeth* on *Edge*, we plainly see what an Intercouse there is, between the *Teeth*, and the *Organ* of the *Hearing*, by the Taking of the End of a Bow, between the *Teeth*, and *Striking* upon the *String*.

Experiment Solitary, touching the *Pleasures*, and *Displeasures* of the *Senses*, especially of *Hearing*. 700

Experiment Solitary, touching Hearing.

696

Experiment Solitary, touching the Pleasure, and Displeasure of the Senses especially of Hearing.

700

NATVRALL HISTORIE.

VIII. Century.

THere be *Mineralls*, and *Fossiles*, in great Variety; But of *Veines* of *Earth Medicinall*, but few; The Chiefe are, *Terra Lemnia*, *Terra Sigillata communis*, and *Bolus Arminus*: Whereof *Terra Lemnia* is the Chiefe. The *Vertues* of them are, for *Curing* of *Wounds*, *Stanching* of *Bloud*, *Stopping* of *Fluxes* and *Rheumes*, and *Arresting* the *Spreading* of *Poison*, *Infection*, and *Putrefaction*: And they have of all other *Simples*, the Perfectest and Purest *Qualitie* of *Drying*, with little or no Mixture of any other *Quality*. Yet it is true, that the *Bole-Arminick* is the most *Cold* of them; And that *Terra Lemnia* is the most *Hot*; For which Cause, the *Island Lemnos*, where it is digged, was in the Old *Fabulous Ages* consecrated to *Vulcan*.

Experiment Solitary, touching *Veines* of *Medicinall Earth*. 701

ABout the *Bottome* of the *Straights* are gathered great Quantities of *Sponges*, which are gathered from the sides of *Rockes*, being as it were a large, but tough, *Mosse*. It is the more to be noted, because that there bee but few *Substances*, *Plant-like*, that grow deep within the *Sea*; For they are gathered sometimes fifteen Fathome deepe; And when they are laid on Shoare, they seeme to be of great Bulke; But crushed together, will be transported in a very small Roome.

Experiment Solitary, touching the *Growth* of *Sponges*. 702

IT seemeth, that *Fish*, that are used to the *Salt-Water*, doe neverthelesse delight more in *Fresh*. We see, that *Salmons*, and *Smelts* love to get into *Rivers*, though it be against the *Stream*. At the *Haven* of *Constantinople*, you shall have great *Quantities* of *Fish* that come from the *Euxine-Sea*; that when they come into the *Fresh Water*, doe inebriate and turne up their *Bellies*; So as you may take them with your Hand. I doubt, there hath not beene sufficient *Experiment*

Experiment Solitary, touching *Sea-Fish* put in *Fresh Waters*. 703

periment made of Putting *Sea-Fish* into *Fresh Water*, *Ponds*, and *Pooles*. It is a Thing of great Use, and Pleasure: For so you may have them new at some good distance from the *Sea*: And besides, it may bee, the *Fish* will eat the pleasanter, and may fall to breed: And it is said that *Colchester Oysters*, which are put into Pits, where the *Sea* goeth and commeth, (but yet so, that there is a *Fresh Water* comming also to them, when the *Sea* voideth,) become by that meanes Fatter, and more Growne.

Experiment Solitary, touching *Attraction* by *Similitude* of *Substance*. 704

THe *Turkish-Bow* giveth a very Forcible *Shoot*; Insomuch as it hath beene knowne, that the *Arrow* hath pierced a *Steele Target*, or a Peece of *Brasse* of two Inches thicke: But that which is more strange, the *Arrow*, if it be Headed with *Wood*, hath beene knowne to pierce thorow a Peece of *Wood*, of eight Inches thicke. And it is certaine, that we had in use at one time, for *Sea-Fight*, short *Arrowes*, which they called *Sprights*, without any other Heads, save *Wood* sharpened; which were discharged out of *Muskets*, and would pierce thorow the Sides of *Ships*, where a *Bullet* would not pierce. But this dependeth upon one of the greatest *Secrets* in all *Nature*; Which is, that *Similitude* of *Substance* will cause *Attraction*, where the Body is wholly freed from the *Motion* of *Gravity*: For if that were taken away, *Lead* would draw *Lead*, and *Gold* would draw *Gold*, and *Iron* would draw *Iron*, without the help of the *Load-Stone*. But this same *Motion* of *Weight* or *Gravitie*, (which is a meere *Motion* of the *Matter*, and hath no Affinity with the *Forme*, or *Kinde*,) doth kill the other *Motion*, except it selfe bee killed by a violent *Motion*; And in these *Instances* of *Arrowes*; For then the *Motion* of *Attraction* by *Similitude* of *Substance*, beginneth to shew it selfe. But we shall handle this Point of *Nature* fully in due Place.

Experiment Solitary, touching certaine *Drinkes* in *Turkey*. 705

THey have in *Turkey*, and the *East*, certaine *Confections*, which they call *Servets*, which are like to *Candied Conserves*; And are made of *Sugar* and *Limons*, or *Sugar* and *Citrons*, or *Sugar* and *Violets*, and some other Flowers; And some Mixture of *Amber* for the more delicate Persons; And those they dissolve in *Water*, and thereof make their *Drinke*, because they are forbidden *Wine* by their *Law*. But I doe much marvell, that no *Englishman*, or *Dutchman*, or *German*, doth set up *Brewing* in *Constantinople*; Considering they have such Quantity of *Barley*. For as for the generall Sort of *Men*, Frugality may be the *Cause* of *Drinking Water*; For that it is no small Saving, to pay nothing for ones *Drinke*: But the better Sort mought well be at the Cost. And yet I wonder the lesse at it, because I see *France*, *Italy*, or *Spaine*, have not taken into use, *Beere*, or *Ale*; Which (perhaps) if they did, would better both their Healths, and their Complexions. It is likely it would be Matter of great Gaine to any, that should begin it in *Turkey*.

Experiments in Consort touching *Sweat*. 706

IN *Bathing* in *Hot Water*, *Sweat* (nevertheless) commeth not in the *Parts* under the *Water*. The *Cause* is; First, for that *Sweat* is a Kinde of *Colliquation*. And that Kinde of *Colliquation* is not made, either by an *Over-Drie Heat*, or an *Over-Moist Heat*. For *Over-Moisture* doth somewhat extinguish the *Heat*; As wee see that even *Hot-Water* quencheth *Fire*: And *Over-Drie Heat* shutteth the *Pores*: And therefore *Men* will sooner *Sweat* covered before the *Sunne*, or *Fire*, than if they stood naked; And *Earthen Bottles*, filled with *Hot Water*, doe provoke, in Bed, a *Sweat* more daintily, than *Brick-Bats Hot*. Secondly, *Hot Water* doth cause *Evaporation* from the *Skin*; So as it spendeth the Matter, in those Parts under the *Water*, before it issueth in

Sweat.

Sweat. Againe, *Sweat* commeth more plentifully, if the *Heat* bee increased by *Degrees*, than if it be greatest at first, or equall. The *Cause* is, for that the *Pores* are better opened by a *Gentle Heat*, than by a more *Violent*; And by their opening the *Sweat* issueth more abundantly. And therefore *Physitians* may doe well, when they provoke *Sweat* in Bed, by *Bottles*, with a *Decoction* of *Sudorifick Herbs* in *Hot Water*, to make two *Degrees* of *Heat* in the *Bottles*; And to lay in the Bed, the *lesse Heated* first, and after halfe an Houre the *more Heated*.

707 *Sweat* is *Salt* in Taste; The *Cause* is, for that, that *Part* of the *Nourishment*, which is *Fresh* and *Sweet*, turneth into *Bloud*, and *Flesh*; And the *Sweat* is onely that *Part*, which is *Separate*, and *Excerned*. *Bloud* also Raw, hath some *Saltnesse*, more than Flesh; because the *Assimilation* into *Flesh*, is not without a little and subtile *Excretion* from the *Bloud*.

708 *Sweat* commeth forth more out of the *Vpper Parts* of the *Body*, than the *Lower*; The *Reason* is, because those *Parts* are more replenished with *Spirits*; And the *Spirits* are they that put forth *Sweat*: Besides, they are lesse *Fleshy*, and *Sweat* issueth (chiefly) out of the *Parts* that are lesse *Fleshy*, and more *Drie*; As the *Forehead*, and *Breast*.

709 Men *Sweat* more in *Sleepe*, than *Waking*; And yet *Sleep* doth rather stay other *Fluxions*, than cause them; As *Rheumes*, *Loosenesse* of the *Body*, &c. The *Cause* is, for that in *Sleepe*, the *Heat*, and *Spirits* doe naturally move inwards, and there rest. But when they are collected once within, the *Heat* becommeth more Violent, and Irritate; And thereby expelleth *Sweat*.

710 *Cold Sweats* are (many times) *Mortall*, and neare *Death*; And alwayes *Ill*, and *Suspected*; As in *Great Feares*, *Hypochondriacall Passions*, &c. The *Cause* is, for that *Cold Sweats* come by a *Relaxation* or *Forsaking* of the *Spirits*, whereby the *Moisture* of the Body, which *Heat* did keepe firme in the *Parts*, severeth, and issueth out.

711 In those *Diseases* which cannot be discharged by *Sweat*, *Sweat* is ill, and rather to bee stayed; As in *Diseases* of the *Lungs*, and *Fluxes* of the *Belly*; But in those *Diseases*, which are expelled by *Sweat*, it easeth and lightneth; As in *Agues*, *Pestilences*, &c. The *Cause* is, for that *Sweat* in the Latter Sort is partly *Critical*, and sendeth forth the *Matter* that offendeth; But in the Former, it either proceedeth from the *Labour* of the *Spirits*, which sheweth them Oppressed; Or from *Motion* of *Consent*, when *Nature* not able to expell the *Disease*, where it is seated, moveth to an *Expulsion* indifferent over all the *Body*.

Experiment Solitary, touching the *Glo-worme*.

712 THe *Nature* of the *Glo-worme* is hitherto not well observed. Thus much we see; That they breed chiefly in the *Hottest Moneths* of *Summer*; And that they breed not in *Champaigne*, but in *Bushes*, and *Hedges*. Whereby it may be conceived, that the *Spirit* of them is very fine, and not to be refined, but by *Summer Heats*: And againe, that by reason of the Finenesse, it doth easily exhale. In *Italy*, and the *Hotter Countries*, there is a *Flie* they call *Lucciole*, that shineth as the *Glo-worme*, doth; And it may be is the *Flying Glo-worme*. But that *Flie* is chiefly upon *Fens*, and *Marrishes*. But yet the two former *Observations* hold; For they are not seene, but in the *Heat* of *Summer*; And *Sedge*, or other *Greene* of the *Fens*, give as good Shade, as *Bushes*. It may be the *Glo-wormes* of the *Cold Countries* ripen not so far re as to be *Winged*.

Experiments in Consort, touching the *Impressions*, which the *Passions* of the *Minde* make upon the *Body*.

713 THe *Passions* of the *Minde*, worke upon the *Body* the *Impressions* following. *Feare* causeth *Palenesse*; *Trembling*; The *Standing* of the *Haire upright*;

right; *Starting*; and *Scritching*. The *Paleneſſe* is cauſed, for that the *Bloud* runneth inward, to ſuccour the *Heart*. The *Trembling* is cauſed, for that through the *Flight* of the *Spirits* inward, the *Outward Parts* are deſtituted, and not ſuſtained. *Standing upright* of the *Haire* is cauſed, for that by *Shutting* of the *Pores* of the *Skin*, the *Haire* that lyeth aſloape, muſt needs Riſe. *Starting* is both an *Apprehenſion* of the *Thing feared*; (And, in that kinde, it is a *Motion* of *Shrinking*;) And likewiſe an *Inquiſition*, in the beginning, what the Matter ſhould be; (And in that kinde it is a *Motion* of *Erection*;) And therefore, when a *Man* would liſten ſuddenly to any Thing, he *Starteth*; For the *Starting* is an *Erection* of the *Spirits* to attend. *Skritching* is an *Appetite* of *Expelling* that which ſuddenly ſtriketh the *Spirits*: For it muſt bee noted, that many *Motions*, though they bee unprofitable to expell that which hurteth, yet they are *Offers* of *Nature*, and cauſe *Motions* by *Conſent*; As in *Groaning*, or *Crying* upon *Paine*.

714 *Griefe*, and *Paine* cauſe *Sighing*; *Sobbing*; *Groaning*; *Screaming*; and *Roaring*; *Teares*; *Diſtorting* of the *Face*; *Grinding* of the *Teeth*; *Sweating*. *Sighing* is cauſed by the *Drawing* in of a greater *Quantity* of *Breath* to refreſh the *Heart* that laboureth: like a great *Draught* when one is thirſty. *Sobbing* is the ſame Thing ſtronger. *Groaning*, and *Screaming*, and *Roaring*, are cauſed by an *Appetite* of *Expulſion*, as hath beene ſaid: For when the *Spirits* cannot expell the Thing that hurteth, in their Striſe to doe it, by *Motion* of *Conſent*, they expell the *Voice*. And this is, when the *Spirits* yeeld, and give over to reſiſt; For if one doe conſtantly reſiſt *Paine*, he will not groane. *Teares* are cauſed by a *Contraction* of the *Spirits* of the *Braine*; Which *Contraction* by conſequence aſtringeth the *Moiſture* of the *Braine*, and thereby ſendeth *Teares* into the *Eyes*. And this *Contraction*, or *Compreſſion* cauſeth alſo *Wringing* of the *Hands*; For *Wringing* is a *Geſture* of *Expreſſion* of *Moiſture*. The *Diſtorting* of the *Face* is cauſed by a *Contention*, firſt to beare and reſiſt, and then to expell; Which maketh the Parts knit firſt, and afterwards open. *Grinding* of the *Teeth* is cauſed (likewiſe) by a *Gathering* and *Serring* of the *Spirits* together to reſiſt; Which maketh the *Teeth* alſo to ſet hard one againſt another. *Sweating* is alſo a *Compound Motion* by the *Labour* of the *Spirits*, firſt to reſiſt, and then to expell.

715 *Ioy* cauſeth a *Chearefulneſſe* and *Vigour* in the *Eyes*; *Singing*; *Leaping*; *Dancing*; And ſometimes *Teares*. All theſe are the effects of the *Dilatation*, and *Comming* forth of the *Spirits* into the *Outward Parts*; Which maketh them more *Lively*, and *Stirring*. We know it hath beene ſeene, that *Exceſſive ſudden Ioy* hath cauſed *Preſent Death*, while the *Spirits* did ſpread ſo much, as they could not retire againe. As for *Teares*, they are the Effects of *Compreſſion* of the *Moiſture* of the *Braine*, upon *Dilatation* of the *Spirits*. For *Compreſſion* of the *Spirits* worketh an *Expreſſion* of the *Moiſture* of the *Braine*, by *Conſent*, as hath beene ſaid in *Griefe*. But then in *Ioy*, it worketh it diverſly; *viz.* by *Propulſion* of the *Moiſture*, when the *Spirits* dilate, and occupie more Roome.

716 *Anger* cauſeth *Paleneſſe* in ſome, and the *Going* and *Comming of the Colour* in Others: Alſo *Trembling* in ſome; *Swelling*; *Foaming* at the *Mouth*; *Stamping*; *Bending* of the *Fiſt*. *Paleneſſe*, and *Going*, and *Comming* of the *Colour*, are cauſed by the *Burning* of the *Spirits* about the *Heart*; Which to refreſh themſelves, call in more *Spirits* from the *Outward Parts*. And if the *Paleneſſe* be alone, without *Sending forth* the *Colour* againe, it is commonly joyned with ſome *Feare*; But in many there is no *Paleneſſe* at all, but contrariwiſe *Redneſſe* about the *Cheekes*, and *Gills*; Which is by the *Sending forth* of the

Spirits

Spirits in an *Appetite* to *Revenge*. *Trembling* in *Anger* is likewise by a *Calling* in of the *Spirits*; And is commonly, when *Anger* is joyned with *Feare*. *Swelling* is caused, both by a *Dilatation* of the *Spirits* by *Over-Heating*, and by a *Liquefaction* or *Boyling* of the *Humours* thereupon. *Foaming* at the *Mouth* is from the same *Cause*, being an *Ebullition*, *Stamping*, and *Bending* of the *Fist*, are caused by an *Imagination* of the *Act* of *Revenge*.

Light Displeasure or *Dislike*, causeth *Shaking* of the *Head*; *Frowning*, and *Knitting* of the *Browes*. These *Effects* arise from the same *Causes* that *Trembling*, and *Horrour* doe; Namely, from the *Retiring* of the *Spirits*, but in a lesse degree. For the *Shaking* of the *Head* is but a Slow and Definite *Trembling*; And is a *Gesture* of *Slight Refusall*: And we see also, that a *Dislike* causeth (often) that *Gesture* of the *Hand*, which we use, when we refuse a Thing, or warne it away. The *Frowning* and *Knitting* of the *Browes*, is a *Gathering*, or *Serring* of the *Spirits*, to resist in some Measure. And we see also, this *Knitting* of the *Browes* will follow upon earnest *Studying*, or *Cogitation* of any Thing, though it be without *Dislike*. 717

Shame causeth *Blushing*; And *Casting Downe* of the *Eyes*. *Blushing* is the *Resort* of *Bloud* to the *Face*; Which in the *Passion* of *Shame*, is the *Part* that laboureth most. And although the *Blushing* will be seen in the whole *Breast*, if it bee Naked, yet that is but in Passage to the *Face*. As for the *Casting downe* of the *Eyes*, it proceedeth of the *Reverence* a Man beareth to other Men; Whereby, when he is ashamed, he cannot endure to looke firmely upon Others: And we see, that *Blushing*, and the *Casting downe* of the *Eyes* both, are more when wee come before Many; *Ore Pompeii quid Mollius? Nunquàm non coram pluribus erubuit*: And likewise when we come before *Great*, or *Reverend Persons*. 718

Pitie causeth sometimes *Teares*; And a *Flexion* or *Cast* of the *Eye aside*. *Teares* come from the same *Cause* that they doe in *Griefe*: for *Pitie* is but *Griefe* in Anothers Behalfe. The *Cast* of the *Eye* is a *Gesture* of *Aversion*, or *Loathnesse* to behold the *Object* of *Pitie*. 719

Wonder causeth *Astonishment*, or an *Immoveable Posture* of the *Body*; *Casting* up of the *Eyes* to *Heaven*; And *Lifting* up of the *Hands*. For *Astonishment*, it is caused by the *Fixing* of the *Minde* upon one *Object* of *Cogitation*, whereby it doth not spatiate and transcurre, as it useth: For in *Wonder* the *Spirits* flie not, as in *Feare*; But onely settle, and are made lesse apt to move. As for the *Casting* up of the *Eyes*, and *Lifting* up of the *Hands*, it is a *Kinde* of *Appeale* to the *Deity*; Which is the *Authour*, by *Power*, and *Providence*, of *Strange Wonders*. 720

Laughing causeth a *Dilatation* of the *Mouth*, and *Lips*; A *Continued Expulsion* of the *Breath*, with the loud *Noise*, which maketh the *Interjection* of *Laughing*; *Shaking* of the *Breast*, and *Sides*; *Running* of the *Eyes* with *Water*, if it be Violent, and Continued. Wherein first it is to be understood, that *Laughing* is scarce (properly) a *Passion*, but hath his *Source* from the *Intellect*; For in *Laughing* there ever precedeth a *Conceit* of somewhat *Ridiculous*. And therefore it is Proper to *Man*. Secondly, that the *Cause* of *Laughing* is but a *Light Touch* of the *Spirits*, and not so deepe an *Impression* as in other *Passions*. And therefore, (that which hath no *Affinitie* with the *Passions* of the *Minde*,) it is moved, and that in great vehemency, onely by *Tickling* some *Parts* of the *Body*: And we see that *Men* even in a *Grieved State* of *Minde*, yet cannot sometimes forbeare *Laughing*. Thirdly, it is ever joyned with some *Degree* of *Delight*: And therefore *Exhilaration* hath some *Affinitie* with *Joy*, though it be a much *Lighter Motion*: *Res severa est verum Gaudium*. 721

dium. Fourthly, that the *Object* of it is *Deformitie*, *Absurditie*, *Shrewd Turnes*, and the like. Now to speake of the *Causes* of the *Effects* before mentioned, whereunto these *Generall Notes* give some *Light*. For the *Dilatation* of the *Mouth* and *Lips*, *Continued Expulsion* of the *Breath* and *Voice*, and *Shaking* of the *Breast* and *Sides*, they proceed (all) from the *Dilatation* of the *Spirits*; Especially being Sudden. So likewise, the *Running* of the *Eyes* with *Water*, (as hath beene formerly touched, where wee spake of the *Teares* of *Ioy* and *Griefe*,) is an Effect of *Dilatation* of the *Spirits*. And for *Suddennesse*, it is a great *Part* of the *Matter*: For we see, that any *Shrewd Turne* that lighteth upon Another; Or any *Deformity*, &c. moveth *Laughter* in the Instant; Which after a little time it doth not. So we cannot *Laugh* at any thing after it is *Stale*, but whilest it is *New*: And even in *Tickling*, if you *Tickle* the *Sides*, and give warning; Or give a *Hard* or *Continued Touch*, it doth not move *Laughter* so much.

722 *Lust* causeth a *Flagrancy* in the *Eyes*; and *Priapisme*. The *Cause* of both these is, for that in *Lust*, the *Sight*, and the *Touch*, are the Things desired: And therefore the *Spirits* resort to those parts, which are most affected. And note well in generall, (for that great Use may be made of the *Observation*,) that (evermore) the *Spirits*, in all *Passions*, resort most to the *Parts*, that labour most, or are most affected. As in the last, which hath been mentioned, they resort to the *Eyes*, and *Venereous Parts*: In *Feare*, and *Anger*, to the *Heart*: In *Shame* to the *Face*: And in *Light Dislikes* to the *Head*.

Experiments in Consort, touching *Drunkennesse*.

IT hath been observed by the *Ancients*, and is yet beleeved, that the *Sperme* of *Drunken Men* is *Vnfruitfull*. The *Cause* is, for that it is *Over-moistened*, and wanteth *Spissitude*. And wee have a merry Saying, that they that goe *Drunke* to *Bed*, get *Daughters*.

723

724 *Drunken Men* are taken with a plaine *Defect*, or *Destitution* in *Voluntary Motion*. They Reele; They tremble; They cannot stand, nor speak strongly. The *Cause* is, for that the *Spirits* of the *Wine*, oppresse the *Spirits Animall*, and occupate Part of the Place, where they are; And so make them Weake to move. And therefore, *Drunken Men* are apt to fall asleep: And *Opiates*, and *Stupefactives*, (as *Poppy*, *Henbane*, *Hemlocke*, &c.) induce a kinde of *Drunkennesse*, by the *Grossenesse* of their *Vapour*; As *Wine* doth by the *Quantity* of the *Vapour*. Besides, they rob the *Spirits Animall* of their *Matter*, whereby they are nourished: For the *Spirits* of the *Wine* prey upon it, as well as they: And so they make the *Spirits* lesse Supple, and Apt to move.

725 *Drunken Men* imagine every *Thing turneth round*; They imagine also that *Things come upon them*; They *See* not well *Things afarre off*; Those Things that they *See neare Hand*, they *See out of their Place*; And (sometimes) they *see Things double*. The *Cause* of the Imagination that *Things turne Round*, is, for that the *Spirits* themselves turne, being compressed by the *Vapour* of the *Wine*: (For any *Liquid Body* upon *Compression*, turneth, as we see in *Water*:) And it is all one to the *Sight*, whether the *Visuall Spirits* move, or the *Object* moveth, or the *Medium* moveth. And we see that long *Turning Round* breedeth the same Imagination. The *Cause* of the Imagination that *Things come upon them*, is, for that the *Spirits Visuall* themselves draw backe; which maketh the *Object* seeme to come on; And besides, when they see Things turne Round, and Move, *Feare* maketh them thinke they come upon them. The *Cause* that they cannot see *Things afarre off*, is the *Weaknesse* of the *Spirits*; for in every *Megrim*, or *Vertigo*, there is an *Obtenebration* joyned with a Semblance of *Turning Round*; Which we see also in the lighter Sort of *Swounings*.

nings. The *Cause* of *Seeing things out of their Place*, is the *Refraction* of the *Spirits Visuall*; For the *Vapour* is as an *Vnequall Medium*; And it is, as the Sight of Things, out of place, in *Water*. The *Cause* of *Seeing Things double*, is, the *Swift* and *Vnquiet Motion* of the *Spirits*, (being Oppressed,) to and fro; For, (as was said before,) the *Motion* of the *Spirits Visuall*, and the *Motion* of the *Object*, make the same *Appearances*; And for the *Swift Motion* of the *Object*, wee see, that if you fillip a *Lute-String*, it sheweth double, or Treble.

Men are sooner *Drunke* with *Small Draughts*, than with *Great*. And againe, *Wine Sugred* inebriateth lesse, than *Wine Pure*. The *Cause* of the Former is, for that the *Wine* descendeth not so fast to the *Bottome* or the *Stomach*; But maketh longer Stay in the *Vpper Part* of the *Stomach*, and sendeth *Vapours* faster to the *Head*; And therefore inebriateth sooner. And, for the same Reason, *Sops* in *Wine*, (Quantity for Quantity,) inebriate more, than *Wine* of it selfe. The *Cause* of the Latter is, for that the *Sugar* doth inspissate the *Spirits* of the *Wine*, and maketh them not so easie to resolve into *Vapour*. Nay further, it is thought, to be some Remedy against *Inebriating*, if *Wine Sugred* be taken after *Wine Pure*. And the same Effect is wrought either by *Oyle*, or *Milke*, taken upon much *Drinking*. 726

THe *Vse* of *Wine*, in *Drie*, and *Consumed Bodies*, is hurtfull; In *Moist*, and *Full Bodies*, it is good. The *Cause* is, for that the *Spirits* of the *Wine* doe prey upon the *Dew*, or *Radicall Moisture*, (as they terme it,) of the *Body*, and so deceive the *Animall Spirits*. But where there is *Moisture* Enough, or Superfluous, there *Wine* helpeth to disgest, and desiccate the *Moisture*. Experiment Solitary, touching the *Help* or *Hurt* of *Wine*, though *Moderately used*. 727

THe *Catterpiller* is one of the most Generall of *Wormes*, and breedeth of *Dew*, & *Leaves*: For wee see infinite Number of *Catterpillers*, which breed upon *Trees*, and *Hedges*; By which the *Leaves* of the *Trees*, or *Hedges*, are in great Part consumed; As well by their Breeding out of the *Leafe*, as by their Feeding upon the *Leafe*. They breed in the *Spring* chiefly, because then there is both *Dew*, and *Leafe*. And they breed commonly when the *East Winds* have much blowne: The *Cause* whereof is, the *Drinesse* of that *Wind*: For to all *Vivification* upon *Putrefaction*, it is requisite the *Matter* be not too *Moist*: And therefore we see, they have *Copwebs* about them, which is a signe of a *Slimy Drinesse*: As wee see upon the *Ground*, whereupon, by *Dew*, and *Sunne*, *Copwebs* breed all over. We see also the *Greene Catterpiller* breedeth in the Inward Parts of *Roses*, especially not blowne, where the *Dew* sticketh: But especially *Catterpillers*, both the greatest, and the most, breed upon *Cabbages*, which have a *Fat Leafe*, and apt to *Putrifie*. The *Catterpiller* towards the *End* of *Summer* waxeth *Volatile*, and turneth to a *Butterflie*, or perhaps, some other *Fly*. There is a *Catterpiller*, that hath a *Furre*, or *Downe* upon him, and seemeth to have Affinitie with the *Silke-worme*. Experiment Solitary, touching *Catterpillers*. 728

THe *Flies Cantharides* are bred of a *Worme*, or *Catterpiller*, but peculiar to certaine *Fruit-Trees*; As are the *Fig-tree*, the *Pine-tree*, and the *Wilde Briar*; All which beare *Sweet Fruit*; And *Fruit* that hath a kinde of secret *Biting*, or *Sharpnesse*: For the *Fig* hath a *Milke* in it, that is *Sweet*, and *Corrosive*: The *Pine-Apple* hath a *Kernell* that is *Strong* and *Absterfive*: The *Fruit* of the *Briar* is said to make *Children*, or those that Eat them, *Scabbed*. And therefore, no marvell though *Cantharides* have such a *Corrosive*, and *Cauterizing Quality*; For there is not one other of the *Insecta*, but is bred of a *Duller Matter*. The *Body* of the *Cantharides* is bright coloured; And it may be, Experiment Solitary, touching the *Flies Cantharides*. 729

be, that the delicate-coloured *Dragon-Flies*, may have likewise some *Corrosive Qualitie*.

Experiments in Consort, touching *Lassitude*.

730 *Lassitude* is remedied by *Bathing*, or *Annointing* with *Oyle*, and *Warme Water*. The *Cause* is, for that all *Lassitude* is a kinde of *Contusion*, and *Compression* of the *Parts*; And *Bathing*, and *Annointing* give a *Relaxation*, or *Emollition*: And the *Mixture* of *Oyle*, and *Water*, is better than either of them alone; Because *Water* Entreth better into the *Pores*, and *Oyle* after Entry softneth better. It is found also, that the *Taking* of *Tobacco* doth helpe and discharge *Lassitude*. The Reason whereof is, partly, because by Chearing or Comforting of the *Spirits*, it openeth the *Parts Compressed*, or *Contused*: And chiefly, because it refresheth the *Spirits* by the *Opiate Vertue* thereof; And so dischargeth *Wearinesse*; as *Sleepe* likewise doth.

731 In *Going up a Hill*, the *Knees* will be most *Weary*; In *Going downe a Hill*, the *Thighes*. The *Cause* is, for that in the *Lift* of the *Feet*, when a Man *Goeth up the Hill*, the Weight of the *Body* beareth most upon the *Knees*; And in *Going downe the Hill*, upon the *Thighes*.

Experiment Solitary, touching the *Casting* of the *Skin*, and *Shell* in some *Creatures*.

732 The *Casting* of the *Skin*, is by the *Ancients* compared, to the *Breaking* of the *Secundine*, or *Call*; but not rightly: For that were to make every *Casting* of the *Skin* a New *Birth*: And besides, the *Secundine* is but a generall *Cover*, not shaped according to the *Parts*; But the *Skin* is shaped according to the *Parts*. The *Creatures*, that cast their *Skin*, are; The *Snake*, the *Viper*, the *Grashopper*, the *Lizard*, the *Silke-worme*, &c. Those that cast their *Shell*, are; The *Lobster*, the *Crab*, the *Crafish*, the *Hodmandod* or *Dodman*, the *Tortoise*, &c. The *Old Skins* are found, but the *Old Shells* never: So as it is like, they scale off, and crumble away by degrees. And they are knowne, by the Extreame *Tendernesse* and *Softnesse* of the *New Shell*; And somewhat by the *Freshnesse* of the *Colour* of it. The *Cause* of the *Casting* of *Skin*, and *Shell*, should seeme to be the great *Quantitie* of *Matter* in those *Creatures*, that is fit to make *Skin* or *Shell*; And againe, the *Loosnesse* of the *Skin*, or *Shell*, that sticketh not close to the *Flesh*. For it is certaine, that it is the *New Skin*, or *Shell*, that putteth off the *Old*: So we see, that in *Deere*, it is the *Young Horne*, that putteth off the *Old*; And in *Birds*, the *Young Feathers* put off the *Old*: And so *Birds* that have much *Matter* for their *Beake*, cast their *Beakes*; the *New Beake* Putting off the *Old*.

Experiments in Consort, touching the *Postures* of the *Body*.

733 *Lying*, not *Erect*, but *Hollow*, which is in the Making of the Bed; Or with the *Legs gathered up*, which is in the Posture of the Body, is the more Wholesome. The *Reason* is, the better *Comforting* of the *Stomach*, which is by that lesse Pensile: And we see, that in Weake *Stomachs*, the Laying up of the Legs high, and the Knees almost to the Mouth, helpeth, and comforteth. We see also that *Gally-Slaves*, notwithstanding their Miserie otherwise, are commonly Fat and Fleshy; And the Reason is, because the *Stomach* is supported somewhat in *Sitting*; And is Pensile in *Standing*, or *Going*. And therefore, for *Prolongation* of *Life*, it is good to choose those *Exercises*, where the *Limbs* move more than the *Stomach*, and Belly; As in *Rowing*, and in *Sawing*, being *Set*.

734 *Megrims* and *Giddinesse* are rather when we *Rise*, after long *Sitting*, than while we *Sit*. The *Cause* is, for that the *Vapours*, which were gathered by *Sitting*, by the Sudden *Motion*, flie more up into the *Head*.

735 *Leaning long* upon any *Part* maketh it *Numme*, and, as we call it, Asleepe.

The

The *Cause* is, for that the *Compression* of the *Part* suffereth not the *Spirits* to have free Accesse; And therefore when we come out of it, wee feele a *Stinging*, or *Pricking*; Which is the *Re-entrance* of the *Spirits*.

Experiment Solitary, touching *Pestilentiall Yeares*. 736

IT hath beene noted, that those *Yeares* are *Pestilentiall*, and *Vnwholesome*, when there are great Numbers of *Frogs*, *Flies*, *Locusts*, &c. The *Cause* is plaine; For that those *Creatures* being engendred of *Putrefaction*, when they abound, shew a generall *Disposition* of the *Yeare*, and *Constitution* of the *Aire*, to *Diseases* of *Putrefaction*. And the same *Prognosticke*, (as hath beene said before,) holdeth, if you find *Wormes* in *Oake-Apples*. For the *Constitution* of the *Aire*, appeareth more subtilly, in any of these *Things*, than to the *Sense* of *Man*.

Experiment Solitary, touching the *Prognosticks* of *Hard Winters*. 737

IT is an Observation amongst *Countrey-People*, that *Yeares* of *Store* of *Hawes* and *Heps*, doe commonly portend *Cold Winters*; And they ascribe it to *Gods Providence*, that, (as the *Scripture* saith) reacheth even to the *Falling of a Sparrow*; And much more is like to reach to the *Preservation* of *Birds* in such *Seasons*. The *Naturall Cause* also may be the *Want* of *Heat*, and *Abundance* of *Moisture*, in the *Summer* precedent; Which putteth forth those *Fruits*, and must needs leave great *Quantity* of *Cold Vapours*, not dissipate; Which causeth the *Cold* of the *Winter* following.

Experiment Solitary, touching *Medicines* that *Condense*, and *Relieve* the *Spirits*. 738

THey have in *Turkey*, a *Drinke* called *Coffa*, made of a *Berry* of the same Name, as Blacke as *Soot*, and of a *Strong Sent*, but not *Aromaticall*; Which they take, beaten into Powder, in *Water*, as Hot as they can drinke it: And they take it, and sit at it in their *Coffa-Houses*, which are like our *Tavernes*. This *Drinke* comforteth the *Braine*, and *Heart*, and helpeth *Disgestion*. Certainly this *Berry-Coffa*; The *Root*, and *Leafe Betell*; The *Leafe Tobacco*; And the *Teare* of *Poppy*, (*Opium*,) of which the *Turkes* are great Takers, (supposing it expelleth all Feare;) doe all Condense the *Spirits*, and make them Strong, and Aleger. But it seemeth they are taken after severall manners; For *Coffa* and *Opium* are taken downe; *Tobacco* but in *Smoake*; And *Betell* is but champed in the *Mouth*, with a little *Lime*. It is like there are more of them, if they were well found out, and well corrected. *Quære* of *Henbane-Seed*; Of *Mandrake*; Of *Saffron*, Root, and Flower; Of *Folium Indum*; Of *Amber-grice*; of the *Assyrian Amomum*, if it may bee had; And of the *Scarlet Powder*, which they call *Kermez*; And (generally) of all such Things, as doe inebriate and provoke *Sleepe*. Note that *Tobacco* is not taken in *Root*, or *Seed*, which are more forcible ever than *Leaves*.

Experiment Solitary, touching *Paintings* of the *Body*. 739

THe *Turkes* have a *Blacke Powder*, made of a *Minerall* called *Alcohole*; Which with a fine long Pencill they lay under their *Eye-Lids*; Which doth colour them Blacke; Whereby the *White* of the *Eye* is set off more *white*. With the same *Powder* they colour also the *Haires* of their *Eye lids*, and of their *Eye-browes*, which they draw into Embowed *Arches*. You shall finde that *Xenophon* maketh Mention, that the *Medes* used to paint their *Eyes*. The *Turkes* use with the same *Tincture*, to colour the *Haire* of their *Heads* and *Beards* Blacke: And divers with us, that are growne *Gray*, and yet would appeare *Young*, finde meanes to make their *Haire* black, by Combing it, (as they say,) with a Leaden Combe, or the like. As for the *Chineses*, who are of an ill Complexion, (being Olivaster,) they paint their *Cheekes* Scarlet; Especially their *King*, and *Grandes*. Generally, *Barbarous People*, that goe Naked,

Naked, doe not onely paint Themselves, but they pownce and raze their Skinne, that the *Painting* may not be taken forth; And make it into Works. So doe the *West Indians*; And so did the Ancient *Picts*, and *Brittons*; So that it seemeth, *Men* would have the *Colours* of *Birds Feathers*, if they could tell how; Or at least, they will have *Gay Skins*, in stead of *Gay Cloathes*.

Experiment Solitary, touching the *Vse* of *Bathing* and *Annointing*.
740

IT is strange, that the *use* of *Bathing*, as a Part of *Diet*, is left. With the *Romans*, and the *Grecians*, it was as usuall, as *Eating*, or *Sleeping*: And so is it amongst the *Turkes* at this day: Whereas with us it remaineth but as a *Part* of *Physicke*. I am of Opinion, that the Vse of it, as it was with the *Romans*, was hurtfull to Health; For that it made the Body Soft, and easie to Waste. For the *Turkes* it is more proper, because of their *Drinking Water*, and *Feeding* upon *Rize*, and other Food of small Nourishment, maketh their *Bodies* so Solide, and Hard, as you need not feare that *Bathing* should make them *Froathy*. Besides, the *Turkes* are great *Sitters*, and seldome walke; Whereby they Sweat lesse, and need *Bathing* more. But yet certain it is, that *Bathing*, and especially *Annointing*, may be so used, as it may be a great Help to *Health*, and *Prolongation* of *Life*. But hereof we shall speake in due Place, when we come to handle *Experiments Medicinall*.

Experiment Solitary touching *Chamoletting* of *Paper*.
741

THe *Turks* have a Pretty Art of *Chamoletting* of *Paper*, which is not with us in use. They take divers *Oyled Colours*, and put them severally (in drops) upon *Water*; And stirre the *Water* lightly; And then wet their *Paper*, (being of some Thicknesse,) with it; And the *Paper* will bee Waved, and Veined, like *Chamolet*, or *Marble*.

Experiment Solitary, touching *Cuttle-Inke*.
742

IT is somewhat strange, that the *Bloud* of all *Birds*, and *Beasts*, and *Fishes*, should be of a *Red Colour*, and onely the *Bloud* of the *Cuttle* should bee as *Blacke* as *Inke*. A Man would thinke, that the *Cause* should be the *High Concoction* of that *Bloud*; For we see in ordinary *Puddings*, that the *Boyling* turneth the *Bloud* to be *Blacke*; And the *Cuttle* is accounted a delicate *Meat*, and is much in Request.

Experiment Solitary, touching *Encrease* of *Weight* in *Earth*.
743

IT is reported of Credit, that if you take *Earth*, from Land adjoyning to the *River* of *Nile*; And preserve it in that manner, that it neither come to be Wet, nor Wasted; And Weigh it daily, it will not alter *Weight* untill the seventeenth of *Iune*, which is the Day when the *River* beginneth to rise; And then it will grow more and more *Ponderous* till the *River* commeth to his Heighth. Which if it be true, it cannot bee caused, but by the *Aire*, which then beginneth to Condense; And so turneth within that Small *Mould* into a degree of *Moisture*; Which produceth *Weight*. So it hath beene observed, that *Tobacco*, Cut, and Weighed, and then Dried by the Fire, loseth Weight; and after being laid in the open *Aire*, recovereth *Weight* againe. And it should seeme, that as soone as ever the *River* beginneth to increase, the whole *Bodie* of the *Aire* thereabouts suffereth a Change: For (that which is more strange,) it is credibly affirmed, that upon that very Day, when the *River* first riseth, great *Plagues*, in *Cairo*, use suddenly to breake up.

Experiments in Consort, touching *Sleep*.
744

THose that are very *Cold*, and especially in their *Feet*, cannot get to *Sleepe*. the *Cause* may be, for that in *Sleepe* is required a *Free Respiration*, which *Cold* doth shut in, and hinder: For we see, that in great *Colds*, one can scarce draw

draw his *Breath*. Another *Cause* may be; for that *Cold* calleth the *Spirits* to succour; And therefore they cannot so well close, and goe together in the *Head*; which is ever requisite to *Sleepe*. And for the same *Cause*, *Paine*, and *Noise* hinder *Sleepe*; And *Darknesse* (contrariwise) furthereth *Sleepe*.

Some *Noises* (whereof wee spake in the 112. *Experiment*) help *Sleep*; As the *Blowing* of the *Wind*, the *Trickling* of *Water*, *Humming* of *Bees*, *Soft Singing*, *Reading*, &c. The *Cause* is, for that they move in the *Spirits* a gentle *Attention*; And what soever moveth *Attention*, without too much Labour, stilleth the Naturall and discursive *Motion* of the *Spirits*. 745

Sleepe nourisheth, or at least preserveth *Bodies*, a long time, without other *Nourishment*. *Beasts* that sleep in *Winter*, (as it is noted of *Wilde Beares*,) during their *Sleepe* wax very Fat, though they Eat nothing. *Bats* have bin found in Ovens, and other Hollow Close Places, Matted one upon another; And therefore it is likely that they *Sleepe* in the *Winter time*, and eat Nothing. *Quære*, whether *Bees* doe not *Sleep* all Winter, and spare their *Honey*? *Butterflies*, and other *Flies*, doe not onely *Sleep*, but lie as *Dead* all *Winter*; And yet with a little *Heat* of *Sunne*, or *Fire*, revive againe. A *Dormouse*, both *Winter* and *Summer*, will *Sleep* some dayes together, and eat *Nothing*. 746

To restore *Teeth* in *Age*, were *Magnale Naturæ*. It may bee thought of. But howsoever, the *Nature* of the *Teeth* deserveth to be inquired of, as well as the other *Parts* of *Living Creatures Bodies*.

Experiments in Consort, touching *Teeth* and *Hard Substances* in the *Bodies* of *Living Creatures*.

THere be Five *Parts* in the *Bodies* of *Living-Creatures*, that are of *Hard Substance*; The *Skull*; The *Teeth*; The *Bones*; The *Hornes*; and the *Nailes*. The greatest *Quantity* of *Hard Substance* Continued, is towards the *Head*. For there is the *Skull* of one Entire *Bone*; There are the *Teeth*; There are the *Maxillary Bones*; There is the *Hard Bone*, that is the *Instrument* of *Hearing*; And thence issue the *Hornes*: So that the *Building* of *Living Creatures Bodies*, is like the *Building* of a *Timber-House*, where the *Walls*, and other *Parts* have *Columnes*, and *Beames*; But the *Roofe* is, in the Better Sort of *Houses*, all *Tile*, or *Lead*, or *Stone*. As for *Birds*, they have Three other *Hard Substances* proper to them; The *Bill*, which is of like Matter with the *Teeth*; For no *Birds* have *Teeth*: The *Shell* of the *Egge*: And their *Quills*: For as for their *Spurre*, it is but a *Naile*. But no *Living-Creatures*, that have *Shells* very hard; (As *Oysters*, *Cocles*, *Mustles*, *Scallops*, *Crabs*, *Lobsters*, *Cra-fish*, *Shrimps*, and especially the *Tortoise*;) have *Bones* within them, but onely little *Gristles*. 747

Bones, after full Growth, continue at a Stay: And so doth the *Skull*: *Hornes*, in some *Creatures*, are cast, and renued: *Teeth* stand at a Stay, except their Wearing: As for *Nailes*, they grow continually: And *Bills* and *Beakes* will over-grow, and sometimes be cast; As in *Eagles*, and *Parrots*. 748

Most of the *Hard Substances* flie to the *Extremes* of the *Body*; As *Skull*, *Hornes*, *Teeth*, *Nailes*, and *Beakes*: Onely the *Bones* are more *Inward*, and clad with *Flesh*. As for the *Entrailes*, they are all without *Bones*; Save that a *Bone* is (sometimes) found in the *Heart* of a *Stag*; And it may bee in some other *Creature*. 749

The *Skull* hath *Braines*, as a kinde of *Marrow*, within it. The *Backe-Bone* hath one Kinde of *Marrow*, which hath an Affinitie with the *Braine*; And other *Bones* of the *Body* have another. The *Iaw-Bones* have no *Marrow* Severed, but a little *Pulp* of *Marrow* diffused. *Teeth* likewise are thought to have 750

have a kinde of *Marrow* diffused; which causeth the *Sense*, and *Paine*: But it is rather *Sinnew*; For *Marrow* hath no *Sense*; No more than *Bloud*. *Horne* is alike throughout; And so is the *Naile*.

751 None other of the *Hard Substances* have *Sense*, but the *Teeth*: And the *Teeth* have *Sense*, not onely of *Paine*; but of *Cold*.

But we will leave the Enquiries *of other* Hard Substances, *unto their severall Places*; *And now enquire onely of the* Teeth.

752 The *Teeth* are, in *Men*, of three Kindes: *Sharp*, as the *Fore-Teeth*; *Broad*, as the *Back-Teeth*, which we call the *Molar-Teeth*, or *Grinders*; And *Pointed-Teeth*, or *Canine*, which are betweene both. But there have beene some *Men*, that have had their *Teeth undivided*, as of one whole *Bone*, with some little Marke in the Place of the Division; As *Pyrrhus* had. Some *Creatures* have *Over-long*, or *Out-growing Teeth*, which we call *Fangs*, or *Tuskes*; As *Boares*, *Pikes*, *Salmons*, and *Dogs*, though lesse. Some *Living Creatures* have *Teeth* against *Teeth*; As *Men*, and *Horses*; And some have *Teeth*, especially their *Master-Teeth*, indented one within another, like *Sawes*; As *Lions*; And so againe have *Dogs*. Some *Fishes* have divers *Rowes* of *Teeth* in the *Rooses* of of their *Mouthes*; As *Pikes*, *Salmonds*, *Trouts*, &c. And many more in *Salt-Waters*. *Snakes*, and other *Serpents* have *Venomous Teeth*; Which are sometimes mistaken for their *Sting*.

753 No *Beast* that hath *Hornes*, hath *Vpper-Teeth*; And no *Beast*, that hath *Teeth* above, wanteth them below: But yet if they be of the same kinde, it followeth not, that if the *Hard Matter* goeth not into *Vpper Teeth*, it will goe into *Hornes*; Nor yet *è converso*; For *Doe's*, that have no *Hornes*, have no *Vpper Teeth*.

754 *Horses* have, at three yeares old, a *Tooth* put forth, which they call the *Colts Tooth*; And at foure yeares old there commeth the *Mark-Tooth*, which hath a *Hole*, as big as you may lay a *Pease* within it; And that weareth shorter and shorter, every yeare; Till that at eight yeares old, the *Tooth* is smooth, and the *Hole* gone; And then they say; *That the Marke is out of the Horses Mouth*.

755 The *Teeth* of *Men* breed first, when the *Childe* is about a yeare and halfe old: And then they cast them, and new come about seven yeares old. But divers have *Backward-Teeth* come forth at Twenty, yea some at Thirty, and Forty. *Quære* of the manner of the *Comming* of them forth. They tell a Tale of the old *Countesse* of *Desmond*, who lived till she was sevenscore-years old, that she did *Dentire* twice, or thrice; Casting her old *Teeth*, and others Comming in their Place.

756 *Teeth* are much hurt by *Sweet-Meats*; And by *Painting* with *Mercury*; And by *Things Over-hot*; And by *Things Over-cold*; And by *Rheumes*. And the *Paine* of the *Teeth*, is one of the sharpest of *Paines*.

757 Concerning *Teeth*, these Things are to bee Considered. 1. The *Preserving* of them. 2. The *Keeping* of them *White*. 3. The *Drawing* of them with *Least Paine*. 4. The *Staying* and *Easing* of the *Tooth-ach*. 5. The *Binding* in of *Artificiall Teeth*, where *Teeth* have been strucken out. 6. And last of all, that Great One, of *Restoring Teeth* in *Age*. The *Instances* that give any likelihood of *Restoring Teeth* in *Age*, are; The *Late Comming* of *Teeth* in some; And the *Renewing* of the *Beakes* in *Birds*, which are Commateriall with *Teeth*. *Quære* therefore more particularly how that commeth. And againe, the *Renewing* of *Hornes*. But yet that hath not beene knowne to have beene provoked by *Art*; Therefore let *Triall* be made, whether *Hornes* may be procured to grow in *Beasts* that are not *Horned*, and how? And whether they

they may be procured to come *Larger* than usuall; As to make an *Oxe*, or a *Deere*, have a *Greater Head* of *Hornes*? And whether the *Head* of a *Deere*, that by *Age* is more *Spitted*, may bee brought againe to be more *Branched*; For these *Trialls*, and the like, will shew, whether by *Art* such *Hard Matter* can be called, and provoked. It may bee tried also, whether *Birds* may not have something done to them when they are *Young*, whereby they may bee made to have *Greater*, or *Longer Bills*; Or *Greater*, and *Longer Tallons*? And whether *Children* may not have some *Wash*, or Some thing to make their *Teeth Better*, and *Stronger*? *Corall* is in use as an Help to the *Teeth* of *Children*.

Experiments in Consort, touching the *Generation* and *Rearing* of *Living Creatures* in the *Wombe*.

758 Some *Living Creatures Generate* but at certaine *Seasons* of the *Yeare*; As *Deere*, *Sheep*, *Wilde Coneyes*, &c. And most Sorts of *Birds*, and *Fishes*: Others at *any time* of the *Yeare*, as *Men*; And all *Domestick Creatures*; As *Horses*, *Hogs*, *Dogs*, *Cats*, &c. The *Cause* of *Generation* at *all Seasons* seemeth to be *Fulnesse*: For *Generation* is from *Redundance*. This *Fulnesse*, ariseth from two *Causes*; Either from the *Nature* of the *Creature*, if it be *Hot*, and *Moist*, and *Sanguine*; Or from *Plenty* of *Food*. For the first, *Men*, *Horses*, *Dogs*, &c. which breed at all Seasons, are full of *Heat*, and *Moisture*; *Doves* are the fullest of *Heat* and *Moisture* amongst *Birds*, and therefore breed often; The *Tame Dove* almost continually. But *Deere* are a *Melancholy Drie Creature*, as appeareth by their *Fearfulnesse*, and the *Hardnesse* of their *Flesh*. *Sheepe* are a *Cold Creature*, as appeareth by their *Mildenesse*, and for that they seldome *Drinke*. Most sort of *Birds* are of a drie *Substance* in comparison of *Beasts*. *Fishes* are cold. For the second *Cause*, *Fulnesse* of *Food*; *Men*, *Kine*, *Swine*, *Dogs*, &c. feed full; And we see that those *Creatures*, which being *Wilde*, generate seldome, being *Tame*, generate often; Which is from *Warmth*, and *Fulnesse* of *Food*. We finde, that the Time of *Going* to *Rut* of *Deere* is in *September*; For that they need the whole *Summers Feed* and *Grasse*, to make them fit for *Generation*. And if *Raine* come Earely about the Middle of *September*, they goe to Rut somewhat the sooner; If *Drought*, somewhat the later. So *Sheep*, in respect of their small *Heat*, generate about the same time, or somewhat before. But for the most part, *Creatures* that generate at certaine *Seasons*, generate in the *Spring*; As *Birds*, and *Fishes*; For that the *End* of the *Winter*, and the *Heat* and *Comfort* of the *Spring* prepareth them. There is also another *Reason*, why some *Creatures* generate at certaine *Seasons*: And that is the *Relation* of their *Time* of *Bearing*, to the time of Generation: For no *Creature* goeth to generate, whilest the *Female* is full; Nor whilest she is busie in *Sitting*, or *Rearing* her *Young*. And therefore it is found by Experience, that if you take the *Eggs*, or *Young Ones*, out of the *Neasts* of *Birds*, they will fall to generate againe, three or foure times, one after another.

759 Of *Living Creatures*, some are *longer time* in the *Womb*, and some *Shorter*. *Women* goe commonly nine *Moneths*; The *Cow* and the *Ewe* about sixe Moneths; *Doe's* goe about nine Moneths; *Mares* eleven Moneths; *Bitches* nine Weekes; *Elephants* are said to goe two Yeares; For the Received *Tradition* of ten Yeares is *Fabulous*. For *Birds* there is double Enquiry; The *Distance* betweene the *Treading* or *Coupling*, and the *Laying* of the *Egge*; And againe, between the *Egge Layed*, and the *Disclosing* or *Hatching*. And amongst *Birds* there is lesse *Diversitie* of *Time*, than amongst other *Creatures*; yet some there is: For the *Hen* sitteth but three Weekes; The *Turky-Hen*, *Goose*, and *Ducke*, a Moneth: *Quere* of others. The *Cause* is of the great *Difference* of *Times*, amongst *Living Creatures*, is, Either from the *Nature* of the *Kinde*;

Or from the *Constitution* of the *Womb*. For the former, those that are longer in *Comming* to their *Maturity* or *Growth*, are longer in the *Womb*; As is chiefly seene in *Men*; And so *Elephants* which are long in the *Womb*, are long time in *Comming* to their full *Growth*. But in most other Kindes, the *Constitution* of the *Womb*, (that is, the *Hardnesse*, or *Drinesse* thereof,) is concurrent with the former *Cause*. For the *Colt* hath about foure yeares of *Growth*; And so the *Fawne*; And so the *Calfe*. But *Whelps*, which come to their *Growth* (commonly) within three Quarters of a yeare, are but nine Weekes in the *Womb*. As for *Birds*, as there is lesse Diversitie, amongst them in the time of their *Bringing forth*; So there is lesse Diversitie in the time of their *Growth*; Most of them comming to their *Growth* within a Twelve-Moneth.

760 Some *Creatures* bring forth many *Young Ones* at a *Burthen*; As *Bitches*, *Hares*, *Conneyes*, &c. Some (ordinarily) but *One*; As *VVomen*, *Lionesses*, &c. This may be caused, either by the *Quantity* of *Sperme* required to the *Producing* One of that Kinde; which if lesse be required, may admit greater Number; If more, fewer: Or by the *Partitions* and *Cells* of the *VVomb*, which may sever the *Sperme*.

Experiments in Consort touching *Species Visible*.

761 THere is no doubt, but *Light* by *Refraction* will shew greater, as well as *Things Coloured*. For like as a *Shilling*, in the *Bottome* of the *VVater*, will shew greater; So will a *Candle* in a *Lanthorne*, in the *Bottome* of the *VVater*. I have heard of a Practice, that *Glo-wormes* in *Glasses* were put in the *VVater*, to make the *Fish* come. But I am not yet informed, whether when a *Diver* Diveth, having his *Eyes* open, and swimmeth upon his *Back*; whether (I say) he seeth *Things* in the *Aire*, greater, or lesse. For it is manifest, that when the *Eye* standeth in the *Finer Medium*, and the *Object* is in the *Grosser*, things shew greater; But contrariwise, when the *Eye* is placed in the *Grosser Medium*, and the *Object* in the *Finer*, how it worketh I know not.

762 It would be well boulted out, whether great *Refractions* may not be made upon *Reflexions*, as well as upon *Direct Beames*. For Example, Wee see, that take an *Empty Bason*, put an *Angell* of *Gold*, or what you will, into it; Then goe so farre from the *Bason*, till you cannot see the *Angell*, because it is not in a *Right Line*; Then fill the *Bason* with *Water*, and you shall see it out of his Place, because of the *Reflexion*. To proceed therefore, put a *Looking-Glasse* into a *Bason* of *Water*; I suppose you shall not see the *Image* in a *Right Line*, or at equall *Angles*, but aside. I know not whether this *Experiment* may not be extended so, as you might see the *Image*, and not the *Glasse*; Which for *Beautie*, and *Strangenesse*, were a fine Proofe: For then you should see the *Image* like a *Spirit* in the *Aire*. As for Example, If there be a *Cisterne* or *Poole* of *Water*, you shall place over against it a *Picture* of the *Devill*, or what you will, so as you doe not see the *Water*. Then put a *Looking-Glasse* in the *Water*: Now if you can see the *Devills Picture* aside, not seeing the *Water*, it will looke like a *Devill* indeed. They have an old tale in *Oxford*, that *Friar Bacon* walked betweene two *Steeples*: Which was thought to be done by *Glasses*, when he walked upon the *Ground*.

Experiments in Consort, touching *Impulsion*, and *Percussion*.

763 A *Weighty Body* put into *Motion*, is more easily impelled, than at first when it *Resteth*. The *Cause* is, partly because *Motion* doth discusse the *Torpour* of *Solide Bodies*; Which beside their *Motion* of *Gravity*, have in them a *Naturall Appetite*, not to move at all; And partly, because a *Body* that resteth, doth get, by the *Resistance* of the *Body* upon which it resteth, a stronger

Compression

Compreſſion of *Parts*, than it hath of it Selfe: And therefore needeth more Force to be put in *Motion*. For if a *Weighty Body* be Penſile, and hang but by a *Thred*, the *Percuſſion* will make an *Impulſion* very neare as eaſily, as if it were already in *Motion*.

764 A *Body Over-great*, or *Over-ſmall*, will not be throwne ſo farre, as a *Body* of a *Middle Size*: So that (it ſeemeth) there muſt be a *Commenſuration*, or *Proportion*, betweene the *Body Moved*, and the *Force*, to make it move well. The *Cauſe* is, becauſe to the *Impulſion*, there is requiſite the *Force* of the *Body* that *Moveth*, and the *Reſiſtance* of the *Body* that is *Moved*: And if the *Body* be *too great*, it yeeldeth too little; And if it be *too ſmall*, it reſiſteth too little.

765 It is *Common Experience*, that no *Weight* will preſſe or cut ſo ſtrong, being laid upon a *Body*, as Falling, or ſtrucken from above. It may bee the *Aire* hath ſome part in furthering the *Percuſſion*: But the chiefe *Cauſe* I take to be, for that the *Parts* of the *Body Moved*, have by *Impulſion*, or by the *Motion* of *Gravitie continued*, a *Compreſſion* in them, as well downwards, as they have when they are throwne, or Shot thorow the *Aire* forwards. I conceive alſo, that the quicke *Looſe* of that *Motion*, preventeth the *Reſiſtance* of the *Body* below; And *Priority* of the *Force*, (alwayes;) is of great *Efficacie*; As appeareth in infinite *Inſtances*.

Experiment Solitary, touching *Titillation*.

766 *Tickling* is moſt in the *Soles* of the *Feet*, and under the *Arme-Holes*, and on the *Sides*. The *Cauſe* is, the *Thinneſſe* of the *Skin* in thoſe *Parts*; Joyned with the Rareneſſe of being touched there. For all *Tickling* is a light *Motion* of the *Spirits*, which the *Thinneſſe* of the *Skin*, and *Suddenneſſe*, and *Rareneſſe* of *Touch*, doe further: For we ſee, a *Feather*, or a *Ruſh*, drawne along the *Lip*, or *Cheeke*, doth tickle; Whereas a *Thing* more *Obtuſe*, or a *Touch* more *Hard*, doth not. And for *Suddenneſſe*; Wee ſee no *Man* can tickle himſelfe: We ſee alſo that the *Palme* of the *Hand*, though it hath as *Thin* a *Skin*, as the other *Parts* Mentioned, yet is not Ticklish, becauſe it is accuſtomed to be Touched. *Tickling* alſo cauſeth *Laughter*. The *Cauſe* may bee, the *Emiſſion* of the *Spirits*, and ſo of the *Breath*, by a *Flight* from *Titillation*; For upon *Tickling*, we ſee there is ever a *Starting*, or *Shrinking* away of the Part, to avoid it; And we ſee alſo, that if you *Tickle* the *Noſtrils* with a *Feather*, or *Straw*, it procureth *Sneezing*; Which is a *Sudden Emiſſion* of the *Spirits*, that doe likewiſe expell the *Moiſture*. And *Tickling* is ever Painfull, and not well endured.

Experiment Solitary, touching the *Scarcitie* of *Raine* in *Ægypt*.

767 It is ſtrange, that the *River* of *Nilus*, Over-flowing, as it doth, the *Countrey* of *Ægypt*, there ſhould be nevertheleſſe little or no *Raine* in that *Countrey*. The *Cauſe* muſt be, Either in the *Nature* of the *Water*; Or in the *Nature* of the *Aire*; Or of Both. In the *Water*, it may bee aſcribed, either unto the *Long Race* of the *Water*: For *Swift Running Waters* vapour not ſo much as *Standing Waters*; Or elſe to the *Concoction* of the *Water*; For *Waters* well *Concocted* vapour not ſo much, as *Waters Raw*; No more than *Waters* upon the Fire doe vapour ſo much, after ſome time of Boyling, as at the firſt. And it is true, that the *Water* of *Nilus* is ſweeter than other *Waters* in Taſte; And it is excellent Good for the *Stone*, and *Hypochondriacall Melancholy*; Which ſheweth it is *Lenifying*: And it runneth thorow a *Countrey* of a *Hot Climate*, and flat, without Shade, either of *Woods*, or *Hills*; Whereby the *Sunne* muſt needs have great Power to *Concoct* it. As for the *Aire*, (from whence I conceive this want of Showers commeth chiefly;) The *Cauſe*

must be, for that the *Aire* is, of it selfe, *Thin* and *Thirsty*; And as soone as ever it getteth any *Moisture* from the *Water*, it imbibeth, and dissipateth it, in the whole body of the *Aire*; And suffereth it not to remaine in *Vapour*; Whereby it might breed *Raine*.

Experiment Solitary, touching *Clarification*.
768

IT hath beene touched in the *Title* of *Percolations*, (Namely such as are *Inwards*,) that the *Whites* of *Egges*, and *Milke*, doe clarifie; And it is certain, that in *Ægypt*, they prepare and clarifie the *Water* of *Nile*, by putting it into great *Iarres* of *Stone*, and Stirring it about with a few Stamped *Almonds*; Wherewith they also besmeare the Mouth of the *Vessell*; And so draw it off, after it hath rested some time. It were good, to trie this *Clarifying* with *Almonds*, in *New Beere*, or *Must*, to hasten, and perfect the *Clarifying*.

Experiment Solitary, touching *Plants* without *Leaves*.
769

THere be scarce to be found any *Vegetables*, that have *Branches*, and no *Leaves*; except you allow *Corall* for one. But there is also in the *Desarts* of *S. Macario* in *Ægypt*, a *Plant* which is Long, Leaveleſſe, Browne of Colour, and Branched like *Corall*, save that it closeth at the *Top*. This being set in *Water* within *House*, spreadeth and displayeth strangely; And the People thereabouts have a Superstitious Beleefe, that in the *Labour* of *Women*, it helpeth to the *Easie Deliverance*.

Experiment Solitary, touching the *Materialls* of *Glasse*.
770

THe *Chrystalline Venice Glasse*, is reported to be a Mixture, in equall Portions, of *Stones*, brought from *Pavia*, by the *River Ticinum*; And the *Ashes* of a *Weed*, called by the *Arabs Kall*, which is gathered in a *Desart* betweene *Alexandria*, and *Rosetta*; And is by the *Ægyptians* used first for Fuell; And then they crush the *Ashes* into Lumps, like a *Stone*; And so sell them to the *Venetians* for their *Glasse-works*.

Experiment Solitary, touching *Prohibition* of *Putrefaction*, and the *Long Conservation* of *Bodies*.
771

IT is strange, and well to be noted, how long *Carkasses* have continued *Vncorrupt*, and in their former *Dimensions*; As appeareth in the *Mummies* of *Ægypt*; Having lasted, as is conceived, (some of them,) three thousand yeares. It is true, they finde Meanes to draw forth the *Braines*, and to take forth the *Entrailes*, which are the *Parts* aptest to corrupt. But that is nothing to the Wonder: For we see, what a Soft and corruptible *Substance* the *Flesh*, of all the other *Parts* of the *Body*, is. But it should seeme, that according to our *Observation*, and *Axiome*, in our hundredth *Experiment*, *Putrefaction*, which wee conceave to bee so *Naturall* a *Period* of *Bodies*, is but an *Accident*; And that *Matter* maketh not that Haste to *Corruption*, that is conceived. And therefore *Bodies*, in *Shining-Amber*; In *Quick-Silver*; In *Balmes*, (whereof we now speake;) In *Wax*; In *Honey*; In *Gummes*; And (it may be) in *Conservatories* of *Snow*; &c. are preserved very long. It need not goe for Repetition, if wee resume againe that which wee said in the aforesaid *Experiment*, concerning *Annihilation*; Namely, that if you provide against three *Causes* of *Putrefaction*, *Bodies* will not corrupt: The First is, that the *Ayre* be *Excluded*; For that undermineth the *Body*, and conspireth with the *Spirit* of the *Bodie* to dissolve it. The Second is, that the *Body Adjacent* and *Ambient*, be not Commateriall, but meerely Heterogeneall towards the Body that is to be preserved: For if nothing can bee received by the One, Nothing can issue from the Other; Such are *Quick-Silver*, and *White-Amber*, to *Herbs*, and *Flies*, and such *Bodies*. The Third is, that the *Body* to be preserved, be not of that *Grosse*, that it may corrupt within it selfe, although no Part of it issue into the *Body Adjacent*: And therefore it must be rather *Thin*, and

and *Small*, than of *Bulke*. There is a Fourth *Remedie* also, which is; That if the *Body* to be preserved be of *Bulke*, as a *Corps* is, then the *Body* that incloseth it, must have a Vertue to draw forth, and drie the *Moisture* of the *Inward Body*; For else the *Putrefaction* will play within, though Nothing issue forth. I remember *Livy* doth relate, that there were found, at a time, two *Coffins* of *Lead*, in a *Tombe*; Whereof the one contained the *Body* of *King Numa*; It being some foure hundred yeares after his Death: And the other, his *Bookes* of *Sacred Rites* and *Ceremonies*, and the *Discipline* of the *Pontifes*; And that in the *Coffin* that had the *Body*, there was Nothing (at all) to bee seene, but a little light *Cinders* about the *Sides*; But in the *Coffin* that had the *Books*, they were found as fresh, as if they had been but newly Written; being written in *Parchment*, and covered over with *Watch-Candles* of *Wax*; three or four fold. By this it seemeth, that the *Romans*, in *Numa's* time, were not so good *Embalmers*, as the *Egyptians* were; Which was the *Cause* that the Body was utterly consumed. But I finde in *Plutarch*, and Others, that when *Augustus Cæsar* visited the *Sepulchre* of *Alexander* the *Great*, in *Alexandria*, he found the *Body* to keep his *Dimension*; But withall, that, notwithstanding all the *Embalming*, (which no doubt was of the best,) the *Body* was so Tender, as *Cæsar* touching but the *Nose* of it, defaced it. Which maketh me finde it very strange, that the *Ægyptian Mummies* should be reported to be as hard as *Stone-Pitch*: For I finde no difference but one; Which indeed may be very Materiall; Namely, that the Ancient *Ægyptian Mummies*, were shrowded in a Number of Folds of *Linnen*, besmeared with *Gums*, in manner of *Seare-Cloth*; Which it doth not appeare was practised upon the *Body* of *Alexander*.

Experiment Solitary, touching the *Abundance* of *Nitre* in certain *Sea-Shoares*.

772

NEare the *Castle* of *Catie*, and by the *Wells* of *Assan*, in the *Land* of *Idumea*, a great Part of the Way, you would thinke the *Sea* were neare hand, though it be a good distance off: And it is Nothing, but the *Shining* of the *Nitre*, upon the *Sea-Sands*; Such *Abundance* of *Nitre* the *Shores* there doe put forth.

Experiment Solitary, touching *Bodies* that are *borne up* by *Water*.

773

THe *Dead-Sea*, which vomiteth up *Bitumen*, is of that *Crassitude*, as *Living Bodies* bound Hand and Foot, cast into it, have been borne up, and not sunke. Which sheweth, that all *Sinking* into *Water*, is but an *Overweight* of the *Bodie*, put into the *Water*, in respect of the *Water*: So that you may make *Water* so strong, and heavy, of *Quick-Silver*, (perhaps,) or the like, as may beare up *Iron*: Of which I see no Use, but Imposture. We see also, that all *Metalls*, except *Gold*, for the same reason swimme upon *Quicke-Silver*.

Experiment Solitary, touching *Fuell*, that *consumeth little*, or *nothing*.

774

IT is reported, that at the *Foot* of a *Hill*, neare the *Mare mortuum*, there is a *Blacke-Stone* (whereof *Pilgrims* make Fires,) which burneth like a *Coale*, and diminisheth not; But onely waxeth Brighter, and Whiter. That it should doe so, is not strange; For we see *Iron* Red Hot burneth, and consumeth not: But the Strangenesse is, that it should continue any time so: For *Iron*, as soone as it is out of the Fire, deadeth straight-wayes. Certainly, it were a Thing of great Use, and Profit, if you could finde out *Fuell*, that would burne Hot, and yet last long: neither am I altogether Incredulous, but there may be such *Candles*, as they say are made of *Salamanders Wooll*; Being a Kind of *Minerall*, which whiteneth also in the Burning, and consumeth not. The Question is this; *Flame* must be made of somewhat; And commonly it is

is made of some *Tangible Body*, which hath *Weight*: But it is not impossible, perhaps, that it should be made of *Spirit*, or *Vapour*, in a *Body*; (which *Spirit* or *Vapour* hath no *Weight*;) such as is the Matter of *Ignis Fatuus*. But then you will say, that that *Vapour* also can last but a short time: To that it may be answered, That by the helpe of *Oyle*, and *Wax*, and other *Candle-Stuffe*, the *Flame* may continue, and the *Wicke* not burne.

Experiment Solitary *Oeconomicall* touching *Cheape Fuell*.
775

Sea-Coale last longer than *Char-Coale*; And *Char-Coale* of *Roots*, being coaled into great Peeces, last longer than Ordinary *Char-Coale*. *Turfe* and *Peat*, and *Cow-Sheards*, are cheape *Fuels*, and last long. *Small-Coale*, or *Briar-Coale*, powred upon *Char-Coale*, make them last longer. *Sedge* is a cheap *Fuell* to Brew, or Bake with; the rather because it is good for Nothing else. Triall would be made of some Mixture of *Sea-Coale* with *Earth*, or *Chalke*; For if that *Mixture* be, as the *Sea-Coale-Men* use it, privily, to make the Bulke of the *Coale* greater, it is Deceit; But if it bee used purposely, and bee made knowne, it is Saving.

Experiment Solitary, touching the *Gathering* of *Winde* for *Freshnesse*.
776

It is, at this Day, in use, in *Gaza*, to couch *Pot-Sheards* or *Vessels* of *Earth*, in their *Walls*, to gather the *Wind* from the Top, and to passe it downe in Spouts into *Roomes*. It is a Device for *Freshnesse*, in great Heats: And it is said, there are some *Roomes* in *Italy*, and *Spaine*, for *Freshnesse*, and *Gathering* the *Winds*, and *Aire*, in the *Heats* of *Summer*. But they be but *Pennings* of the *Winds*, and *Enlarging* them againe, and making them *Reverberate*, and *goe Round* in *Circles*, rather than this *Device* of *Spouts* in the *Wall*.

Experiment Solitary, touching the *Trials* of *Aires*.
777

There would be used much diligence, in the Choice of some *Bodies*, and *Places*, (as it were,) for the *Tasting* of *Aire*; to discover the *Wholesomenesse*, or *Vnwholesomenesse*, as well of *Seasons*, as of the *Seats* of *Dwellings*. It is certaine, that there be some *Houses*, wherein *Confitures*, and *Pies*, will gather *Mould*, more than in Others. And I am perswaded, that a *Peece* of *Raw Flesh*, or *Fish*, will sooner corrupt in some *Aires*, than in Others. They bee noble *Experiments*, that can make this *Discovery*; For they serve for a *Naturall Divination* of *Seasons*; Better than the *Astronomers* can by their *Figures*: And againe, they teach *Men* where to chuse their *Dwelling*, for their better *Health*.

Experiment Solitary, touching *Increasing* of *Milke* in *Milch Beasts*.
778

There is a Kinde of *Stone*, about *Bethleem*, which they grinde to *Powder*, and put into *Water*, whereof *Cattell* drinke; Which maketh them give more *Milke*. Surely, there would be some better Trialls made of *Mixtures* of *Water* in *Ponds* for *Cattell*, to make them more *Milch*; Or to *Fatten* them; Or to *Keepe* them from *Murraine*. It may bee, *Chalke*, and *Nitre*, are of the best.

Experiment Solitary, touching *Sand* of the *Nature* of *Glasse*.
779

It is reported, that in the *Valley*, neare the *Mountaine Carmel*, in *Iudea*, there is a *Sand*, which, of all other, hath most Affinitie with *Glasse*; Insomuch as other *Mineralls*, laid in it, turne to a *Glassie Substance*, without the *Fire*; And againe *Glasse* put into it, turneth into the *Mother-Sand*. The Thing is very strange, if it be true: And it is likeliest to be Caused by some *Naturall Furnace*, or *Heat* in the *Earth*: And yet they doe not speake of any *Eruption* of *Flames*. It were good to trie in *Glasse-Works*, whether the *Crude Materialls* of *Glasse*, mingled with *Glasse*, already made and Re-moulten, doe not facilitate the *Making* of *Glasse* with lesse *Heat*.

In

IN the *Sea*, upon the *South-West* of *Sicily*, much *Corall* is found. It is a *Sub-Marine Plant*. It hath no *Leaves*: It brancheth onely when it is under *Water*; It is *Soft*, and *Greene* of *Colour*; But being brought into the *Aire*, it becommeth *Hard*, and *Shining* Red, as we see. It is said also, to have a *White Berry*; But we finde it not brought over with the *Corall*. Belike it is cast away as nothing worth: Inquire better of it, for the *Discovery* of the *Nature* of the *Plant*.

Experiment Solitary, touching the *Growth* of *Corall*. 780

THe *Manna* of *Calabria* is the best, and in most Plenty. They gather it from the *Leafe* of the *Mulberry Tree*; But not of such *Mulberry Trees*, as grow in the *Valley's*. And *Manna* falleth upon the *Leaves* by *Night*, as other *Deawes* doe. It should seem, that before those *Deawes* come upon *Trees* in the *Valley's*, they dissipate and cannot hold out. It should seeme also, the *Mulberry-Leafe*, it selfe hath some Coagulating Vertue, which inspissateth the *Deaw*, for that it is not found upon other *Trees*: And wee see by the *Silke-Worme*, which feedeth upon that *Leafe*, what a Dainty Smooth *Iuyce* it hath; And the *Leaves* also, (especially of the Blacke *Mulberry*,) are somewhat Bristly, which may helpe to preserve the *Deaw*. Certainly, it were not amisse, to observe a little better, the *Deawes* that fall upon *Trees*, or *Herbs*, Growing on *Mountaines*; For it may bee, many *Deawes* fall, that spend before they come to the *Valley's*. And I suppose, that he that would gather the best *May-Deaw* for *Medicine*, should gather it from the *Hills*.

Experiment Solitary, touching the *Gathering* of *Manna*. 781

IT is said, they have a manner, to prepare their *Greeke-Wines*, to keep them from *Fuming*, and *Inebriating*, by adding some *Sulphur*, or *Allome*: Whereof the one is *Vnctuous*, and the other is *Astringent*. And certaine it is, that those two *Natures* doe best represse *Fumes*. This *Experiment* would be transferred, unto other *Wine*, and *Strong Beere*, by Putting in some like *Substances*, while they worke; Which may make them both to *Fume* lesse, and to *Inflame* lesse.

Experiment Solitary, touching the *Correcting* of *Wine*. 782

IT is conceived by some, (not improbably,) that the reason, why *Wilde-Fires*, (Whereof the principall Ingredient is *Bitumen*,) doe not quench with *Water*, is, for that the first *Concretion* of *Bitumen*, is a *Mixture*, of a *Fiery*, and *Watry Substance*: So is not *Sulphur*. This appeareth, for that in the *Place* neare *Puteoli*, which they call the *Court* of *Vulcan*, you shall heare under the *Earth* a Horrible Thundring of *Fire*, and *Water*, conflicting together: And there breake forth also *Spouts* of *Boyling Water*. Now that *Place* yeeldeth great *Quantities* of *Bitumen*; Whereas *Ætna*, and *Vesuvius*, and the like, which consist upon *Sulphur*, shoot forth *Smoake*, and *Ashes*, and *Pumice*, but no *Water*. It is reported also, that *Bitumen* Mingled with *Lime*, and Put under *Water*, will make, as it were, an *Artificiall Rocke*; The *Substance* becommeth so Hard.

Experiment Solitary, touching the *Materialls* of *Wilde-Fire*. 783

THere is a *Cement*, compounded of *Flower*, *Whites* of *Egges*, and *Stone powdred*, that becommeth Hard as *Marble*; wherewith *Piscina Mirabilis*, neare *Cuma*, is said to have the *Walls* Plastered. And it is certaine, and tried, that the *Powder* of *Load-Stone*, and *Flint*, by the Addition of *Whites* of *Egges*, and *Gumm-Dragon*, made into *Paste*, will in a few dayes harden to the Hardnesse of a *Stone*.

Experiment Solitary, touching *Plaster* growing as *Hard* as *Marble*. 784

It

Experiment Solitary, touching *Iudgement* of the *Cure* in some *Vlcers* and *Hurts*. 785

IT hath beene noted by the *Ancients*, that in *Full*, or *Impure Bodies*, *Vlcers* or *Hurts* in the *Legges*, are Hard to Cure; And in the *Head* more easie. The *Cause* is, for that *Vlcers* or *Hurts* in the *Legges* require *Deficcation*, which by the *Defluxion* of *Humours* to the *Lower Parts* is hindred; Whereas *Hurts* and *Vlcers* in the *Head* require it not; But contrariwise *Drinesse* maketh them more apt to Consolidate. And in Moderne Observation, the like difference hath beene found, betweene *French-Men*, and *English-Men*; Whereof the ones *Constitution* is more *Drie*, and the others more *Moist*. And therefore a *Hurt* of the *Head* is harder to cure in a *French-Man*, and of the *Legge* in an *English-Man*.

Experiment Solitary, touching the *Healthfulnesse* or *Vnhealthfulnesse* of the *Southerne Winde*. 786

IT hath beene noted by the *Ancients*, that *Southerne Windes*, blowing much, without *Raine*, doe cause a *Fevourous Disposition* of the *Yeare*; But with *Raine*, not. The *Cause* is, for that *Southerne Windes* doe, of themselves, qualifie the *Aire*, to be apt to cause *Fevers*; But when *Showers* are joyned, they doe Refrigerate in Part, and Checke the Sultry *Heat* of the *Southerne Winde*. Therefore this holdeth not in the *Sea-Coasts*, because the *Vapour* of the *Sea*, without *Showers*, doth refresh.

Experiment Solitary, touching *Wounds*. 787

IT hath beene noted by the *Ancients*, that *Wounds* which are made with *Brasse*, heale more easily, than *Wounds* made with *Iron*. The *Cause* is, for that *Brasse* hath, in it selfe, a *Sanative Vertue*; And so in the very Instant helpeth somewhat: But *Iron* is *Corrosive*, and not *Sanative*. And therefore it were good, that the Instruments which are used by *Chirurgions* about *Wounds*, were rather of *Brasse*, than *Iron*.

Experiment Solitary, touching *Mortification* by *Cold*. 788

IN the *Cold Countries*, when Mens *Noses*, and *Eares* are Mortified, and (as it were) Gangrened with *Cold*, if they come to a Fire, they rot off presently. The *Cause* is, for that the few *Spirits*, that remaine in those *Parts*, are suddenly drawne forth, and so *Putrefaction* is made Compleat. But *Snow* Put upon them, helpeth; For that it preserveth those *Spirits* that remaine, till they can revive; And besides, *Snow* hath in it a Secret *Warmth*: As the *Monke* proved out of the *Text*; *Qui dat Nivem sicut Lanam, Gelu sicut Cineres spargit*. Whereby he did inferre, that *Snow* did warme like *Wooll*, and *Frost* did fret like *Ashes*. *Warme Water* also doth good; Because by little and little it openeth the Pores, without any sudden Working upon the *Spirits*. This *Experiment* may bee transferred unto the *Cure* of *Grangrenes*, either comming of themselves, or induced by too much applying of *Opiates*: Wherein you must beware of *Drie Heat*, and resort to Things that are *Refrigerant*, with an Inward *Warmth*, and *Vertue* of Cherishing.

Experiment Solitary, touching *Weight*. 789

WEigh *Iron*, and *Aqua Fortis*, severally; Then dissolve the *Iron* in the *Aqua Fortis*: And weigh the *Dissolution*; And you shall finde it to beare as good *VVeight*, as the *Bodies* did severally: Notwithstanding a good deale of Wast, by a thicke *Vapour*, that issueth during the *VVorking*: Which sheweth that the *Opening* of a *Body*, doth increase the *VVeight*. This was tried once, or twice, but I know not whether there were any *Errour*, in the *Triall*.

Experiment Solitary, touching the *Super-Natation* of *Bodies*. 790

TAke of *Aqua-Fortis* two *Ounces*, of *Quick-Silver* two *Drachmes*, (For that Charge the *Aqua-Fortis* will bear;) The *Dissolution* wil not beare a *Flint*, as big as a *Nutmeg*: Yet (no doubt) the Increasing of the *Weight* of *Water*,

ter will increase his *Power* of *Bearing*; as we see *Broine*, when it is Salt enough, will beare an *Egge*. And I remember well a *Physitian*, that used to give some Mineral *Baths* for the *Gout*, &c. And the *Body* when it was put into the Bath, could not get downe so easily, as in Ordinary *Water*. But it seemeth, the *Weight* of the *Quick-Silver*, more than the *Weight* of a *Stone*; doth not compense the *Weight* of a *Stone*, more than the *Weight* of the *Aqua-Fortis*.

Experiment Solitary, touching the *Flying* of *Vnequall Bodies* in the *Aire*. 791

LEt there be a Body of *Vnequall Weight*; (As of *VVood* and *Lead*, or *Bone* and *Lead*;) If you throw it from you with the *Light-End* forward, it will turne, and the *VVeightier End* will recover to be Forwards; Unlesse the *Body* be Over-long. The *Cause* is, for that the more *Dense Body*, hath a more Violent *Pressure* of the Parts, from the first *Impulsion*; Which is the *Cause*, (though heretofore not found out, as hath beene often said,) of all *Violent Motions*: And when the *Hinder Part* moveth swifter, (for that it lesse endureth *Pressure* of *Parts*,) than the *Forward Part* can make way for it, it must needs be, that the *Body* turn over: For (turned) it can more easily draw forward the *Lighter* Part. *Galilæus* noteth it well; That if an *Open Trough*, wherein *VVater* is, be driven faster then the *VVater* can follow, the *VVater* gathereth upon an heape, towards the *Hinder End*, where the *Motion* began; Which he supposeth, (holding confidently the *Motion* of the *Earth*,) to bee the *Cause* of the *Ebbing* and *Flowing* of the *Ocean*; Because the *Earth* over-runneth the *VVater*. Which *Theory*, though it be false, yet the first *Experiment* is true. As for the *Inequality* of the *Pressure* of *Parts*, it appeareth manifestly in this; That if you take a *Body* of *Stone*, or *Iron*, and another of *VVood*, of the same *Magnitude*, and *Shape*, and throw them with equall Force, you cannot possibly throw the *VVood*, so farre, as the *Stone*, or *Iron*.

Experiment Solitary, touching *Water*, that it may be the *Medium* of *Sounds*. 792

IT is certaine, (as it hath beene formerly, in part, touched,) that *VVater* may be the *Medium* of *Sounds*. If you dash a *Stone* against a *Stone* in the *Bottome* of the *VVater*, it maketh a *Sound*. So a long *Pole* struck upon *Gravell*, in the *Bottome* of the *VVater*, maketh a *Sound*. Nay, if you should thinke that the *Sound* commeth up by the *Pole*, and not by the *VVater*, you shall finde that an *Anchor*, let downe by a *Roape*, maketh a *Sound*; And yet the *Roape* is no Solide *Body*, whereby the *Sound* can ascend.

Experiment Solitary of the *Flight* of the *Spirits* upon *Odious Objects* 793

ALL *Objects* of the *Senses*, which are very *Offensive*, doe cause the *Spirits* to retire; And upon their *Flight*, the *Parts* are (in some degree) destitute; And so there is induced in them a *Trepidation* and *Horrour*. For *Sounds*, we see that the *Grating* of a *Saw*, or any very *Harsh Noise*, will set the *Teeth* on edge, and make all the *Body* Shiver. For *Tastes*, wee see, that in the Taking of a *Potion*, or *Pills*, the *Head*, and the *Necke*, shake. For *Odious Smells*, the like Effect followeth, which is lesse perceived, because there is a Remedy at hand, by Stopping of the *Nose*: But in *Horses*, that can use no such Help, we see the *Smell* of a *Carrion*, especially of a *Dead Horse*, maketh them fly away, and take on, almost as if they were Mad. For *Feeling*, if you come out of the *Sunne*, suddenly, into a *Shade*, there followeth a *Chilnesse* or *Shivering* in all the *Body*. And even in *Sight*, which hath (in effect) no *Odious Object*, Comming into *Sudden Darknesse*, induceth an *Offer* to *Shiver*.

Experiment Solitary, touching the *Super-Reflexion* of *Eccho's*. 794

THere is, in the *City* of *Ticinum*, in *Italy*, a *Church*, that hath Windowes only from above: It is in Length an Hundred Feet, in Breadth Twenty Feet, and in Height neare Fifty; Having a *Doore* in the Middest. It reporteth

porteth the *Voice*, twelve or thirteene times, if you ſtand by the Cloſe *End-Wall*, over againſt the *Doore*. The *Eccho* fadeth, and dyeth by little and little, as the *Eccho* at *Pont-charenton* doth. And the *Voice* ſoundeth, as if it came from above the *Doore*. And if you ſtand at the *Lower End*, or on either *Side* of the *Doore*, the *Eccho* holdeth; But if you ſtand in the *Doore*, or in the *Middeſt* juſt over againſt the *Doore*, not. Note that all *Eccho's* ſound better againſt *Old walls*, than *New*; Becauſe they are more *Drie*, and *Hollow*.

Experiment Solitary, touching the *Force* of *Imagination*, *Imitating* that of the *Senſe*.
795

THoſe *Effects*, which are wrought by the *Percuſſion* of the *Senſe*, and by *Things* in *Fact*, are produced likewiſe in ſome degree, by the *Imagination*. Therefore if a Man ſee another eate *Soure* or *Acide Things*, which ſet the *Teeth* on edge, this *Object* tainteth the *Imagination*. So that he that ſeeth the *Thing* done by another, hath his own *Teeth* alſo ſet on edge. So if a Man ſee another turne ſwiftly, and long; Or if he look upon *Wheeles* that turne, Himſelfe waxeth *Turne-ſick*. So if a Man be upon an *High Place*, without *Railes*, or good Hold, except he be uſed to it, he is Ready to Fall: For *Imagining* a *Fall*, it putreth his *Spirits* into the very *Action* of a *Fall*. So Many upon the *Seeing* of others *Bleed*, or *Strangled*, or *Tortured*, Themſelves are ready to faint, as if they *Bled*, or were in *Strife*.

Experiment Solitary, touching *Preſervation* of *Bodies*.
796

TAke a *Stocke-Gilly-Flower*, and tie it gently upon a Stick, and put them both into a *Stoope Glaſſe*, full of *Quick-ſilver*, ſo that the *Flower* bee covered: Then lay a little *Weight* upon the Top of the *Glaſſe*, that may keepe the Sticke downe; And looke upon them after foure or five dayes; And you ſhall finde the *Flower* Freſh, and the *Stalke* Harder, and leſſe *Flexible*, than it was. If you compare it with another *Flower*, gathered at the ſame time, it will be the more manifeſt. This ſheweth that *Bodies* doe preſerve excellently in *Quick-ſilver*; And not preſerve onely, but, by the *Coldneſſe* of the *Quick-ſilver*, *Indurate*; For the *Freſhneſſe* of the *Flower* may be meerely *Conſervation*; (which is the more to be obſerved, becauſe the *Quick-ſilver* preſſeth the *Flower*;) But the *Stiffeneſſe* of the *Stalke*, cannot be without *Induration*, from the Cold (as it ſeemeth,) of the *Quick-ſilver*.

Experiment Solitary, touching the *Growth*, or *Multiplying* of *Metalls*.
797

IT is reported by ſome of the *Ancients*, that in *Cyprus*, there is a *Kinde* of *Iron*, that being cut into *Little Peeces*, and put into the Ground, if it bee well *Watered*, will increaſe into *Greater Peeces*. This is certaine, and knowne of Old; That *Lead* will multiply, and Increaſe; As hath been ſeene in *Old Statua's* of *Stone*, which have beene put in *Cellars*; The *Feet* of them being bound with *Leaden Bands*; Where (after a time) there appeared, that the *Lead* did ſwell; Inſomuch as it hanged upon the *Stone* like *Warts*.

Experiment Solitary, touching the *Drowning* of the more *Baſe Metall* in the *more Precious*.
798

ICall *Drowning* of *Metals*, when that the *Baſer Metall*, is ſo incorporate with the more *Rich*, as it can by no Meanes bee ſeparated againe: which is a kinde of *Verſion*, though Falſe: As if *Silver* ſhould be inſeparably incorporated with *Gold*; Or *Copper*, and *Lead*, with *Silver*. The Ancient *Electrum* had in it a Fifth of *Silver* to the *Gold*; And made a *Compound Metall*, as fit for moſt uſes, as *Gold*; And more Reſplendent, and more Qualified in ſome other Properties; But then that was eaſily Separated. This to doe privily, or to make the *Compound* paſſe for the *Rich Metall* Simple, is an *Adulteration*, or *Counterfeiting*: But if it bee done Avowedly, and without Diſguizing, it may be a great *Saving* of the *Richer Metall*. I remember to have heard of a Man, skilfull in *Metalls*, that a Fifteenth Part of *Silver*, incorparate with

Gold,

Gold, will not be Recovered by any *Water* of *Separation*; Except you put a Greater *Quantitie* of *Silver*, to draw to it the Lesse; which (hee said) is the last Refuge in *Separations*. But that is a tedious way, which no Man (almost) will thinke on. This would be better enquired; And the *Quantity* of the Fifteenth turned to a Twentieth; And likewise with some little *Additionall*, that may further the *Intrinsique Incorporation*. Note that *Silver* in *Gold* will be detected by *Weight*, compared with the *Dimension*; But *Lead* in *Silver*, (*Lead* being the *Weightier Metall*,) will not be detected; If you take so much the more *Silver*, as will countervaile the *Over-weight* of the *Lead*.

Experiment Solitary, touching *Fixation* of *Bodies*. 799

Gold is the onely *Substance*, which hath nothing in it *Volatile*, and yet melteth without much difficultie. The *Melting* sheweth that it is not Jejune, or Scarce in *Spirit*. So that the *Fixing* of it, is not *Want* of *Spirit* to fly out, but the *Equall Spreading* of the *Tangible Parts*, and the *Close Coacervation* of them: Whereby they have the lesse Appetite, and no Meanes (at all) to issue forth. It were good therefore to trie, whether *Glasse Re-moulten* doe leese any *VVeight*? For the *Parts* in *Glasse* are evenly Spred; But they are not so Close as in *Gold*; As we see by the Easie Admission of *Light*, *Heat*, and *Cold*; And by the *Smalnesse* of the *VVeight*. There be other *Bodies*, *Fixed*, which have little, or no *Spirit*: So as there is nothing to fly out; As wee see in the *Stuffe*, whereof *Coppells* are made; Which they put into *Furnaces*; Upon which *Fire* worketh not: So that there are three *Causes* of *Fixation*; The *Even Spreading* both of the *Spirits*, and *Tangible Parts*; The *Closenesse* of the *Tangible Parts*; And the *Iejuneneſſe* or *Extreme Comminution* of *Spirits*: Of which Three, the two First may bee joyned with a *Nature Liquefiable*; The Last not.

Experiment Solitary, touching the *Restlesse Nature* of Things in *Themselves*, and their *Desire* to *Change*. 800

IT is a Profound *Contemplation* in *Nature*, to consider of the *Emptinesse*, (as we may call it,) or *Insatisfaction* of severall *Bodies*; And of their *Appetite* to take in Others. *Aire* taketh in *Lights*, and *Sounds*, and *Smells*, and *Vapours*; And it is most manifest, that it doth it with a kinde of Thirst, as not satisfied with his owne former Consistence; For else it would never receive them in so suddenly, and easily. *VVater*, and all *Liquours*, doe hastily receive *Drie* and more *Terrestriall Bodies*, Proportionable: And *Drie Bodies*, on the other side, drinke in *VVaters*, and *Liquours*: So that, (as it was well said, by one of the *Ancients*, of *Earthy* and *VVatry Substances*,) *One is a Glue to another*, *Parchment*, *Skins*, *Cloth*, &c. drinke in *Liquours*, though themselves be *Entire Bodies*, and not *Comminuted*, as *Sand*, and *Ashes*; Not apparently Porous: *Metalls* themselves doe receive in readily *Strong-waters*; And *Strong-waters* likewise doe readily pierce into *Metalls*, and *Stones*: And that *Strong-water* will touch upon *Gold*, that will not touch upon *Silver*; And *è Converso*. And *Gold*, which seemeth by the *VVeight*, to be the Closest, and most Solide *Body*, doth greedily drink in *Quick-Silver*. And it seemeth, that this *Reception* of other *Bodies*, is not Violent: For it is (many times) Reciprocall, and as it were with Consent. Of the *Cause* of this, and to what *Axiome* it may bee referred, consider attentively; For as for the Pretty Assertion, that *Matter* is like a *Common Strumpet*, that desireth all *Formes*, it is but a *VVandring Notion*. Onely *Flame* doth not content it selfe to take in any other *Body*; But either to overcome and turne another *Body* into it Selfe, as by Victory; Or it Selfe to dye, and goe out.

NATVRALL HISTORIE.

IX. Century.

Experiments in Consort, touching *Perception* in *Bodies Insensible*, tending to *Naturall Divination*, or *Subtill Trialls*.

IT is certaine, that all *Bodies* whatsoever, though they have no *Sense*, yet they have *Perception*: For when one *Body* is applyed to another, there is a Kinde of *Election*, to embrace that which is Agreeable, and to exclude or expell that which is Ingrate: And whether the *Body* be *Alterant*, or *Altered*, evermore a *Perception* precedeth *Operation*: For else all *Bodies* would be alike One to Another. And sometimes this *Perception*, in some Kinde of *Bodies*, is farre more Subtill than the *Sense*; So that the *Sense* is but a dull thing in Comparison of it: Wee see a *Weather-Glasse*, will finde the least difference of the *Weather*, in *Heat*, or *Cold*, when Men finde it not. And this *Perception* also, is sometimes at *Distance*, as well as upon the *Touch*; As when the *Load-Stone* draweth *Iron*; or *Flame* fireth *Naphtha* of *Babylon*, a great distance off. It is therefore a *Subject* of a very *Noble Enquiry*, to enquire of the more *Subtill Perceptions*; For it is another *Key* to open *Nature*, as well as the *Sense*; And sometimes Better. And besides, it is a Principall *Meanes* of *Naturall Divination*; For that which in these *Perceptions* appeareth early, in the great *Effects* commeth long after. It is true also, that it serveth to *discover* that which is *Hid*, as well as to *foretell* that which is to *Come*;

Come; As it is in many *Subtill Trialls*; As to trie whether *Seeds* be old, or new, the *Sense* cannot informe: But if you boile them in *Water*, the New *Seeds* will sprout sooner: And so of *Water*, the *Taste* will not discover the best *Water*; but the *Speedy Consuming* of it, and many other *Meanes*, which wee have heretofore set downe, will discover it. So in all *Physiognomy*, the *Lineaments* of the *Body* will discover those *Naturall Inclinations* of the *Minde*, which *Dissimulation* will conceale, or *Discipline* will suppresse. Wee shall therefore now handle onely, those two *Perceptions*, which pertaine to *Naturall Divination*, and *Discovery*: Leaving the Handling of *Perception* in other Things, to be disposed Elsewhere. Now it is true, that *Divination* is attained by other *Meanes*; As if you know the *Causes*; If you know the *Concomitants*; you may judge of the *Effect* to follow: And the like may be said of *Discovery*; But we tie our Selves here, to that *Divination* and *Discovery* chiefly, which is Caused by an *Early*, or *Subtill Perception*.

The *Aptnesse* or *Propension* of *Aire*, or *Water*, to Corrupt or Putrifie, (no doubt,) is to be found before it breake forth into manifest *Effects* of *Diseases*, *Blasting*, or the like. Wee will therefore set downe some *Prognosticks* of *Pestilentiall* and *Vnwholesome Yeares*.

801 The *Wind* blowing much from the *South*, without *Raine*; And *Wormes* in the *Oake-Apple*; have beene spoken of before. Also the *Plenty* of *Frogs*, *Grashoppers*, *Flies*, and the like *Creatures* bred of *Putrefaction*, doth portend *Pestilentiall Yeares*.

802 *Great*, and *Early Heats* in the *Spring*, (and namely in *May*,) without *Winds*, portend the same; And generally so doe *Yeares* with little *Wind*, or *Thunder*.

803 *Great Droughts* in *Summer*, lasting till towards the *End* of *August*, and some *Gentle Showres* upon them; And then some *Drie Weather* againe; Doe portend a *Pestilent Summer*, the *Yeare* following: For about the *End* of *August*, all the *Sweetnesse* of the *Earth*, which goeth into *Plants*, and *Trees*, is exhaled; (And much more if the *August* be drie;) So that nothing then can breathe forth of the *Earth*, but a grosse *Vapour*, which is apt to Corrupt the *Aire*: And that *Vapour*, by the first *Showres*, if they be *Gentle*, is released, and commeth forth abundantly. Therefore they that come abroad soone after those *Showres*, are commonly taken with *Sicknesse*: And in *Affricke*, no Body will stirre out of doores, after the first *Showres*. But if the first *Showres* come vehemently, then they rather wash and fill the *Earth*, than give it leave to breathe forth presently. But if *Drie Weather* come againe, then it fixeth and continueth the *Corruption* of the *Aire*, upon the first *Showres* begun; And maketh it of ill *Influence*, even to the Next *Summer*; Except a very *Frostie Winter* discharge it; Which seldome succeedeth such *Droughts*.

804 The *Lesser Infections*, of the *Small Pocks*, *Purple Feavers*, *Agues*, in the *Summer*

mer Precedent, and hovering all *Winter*, doe portend a great *Pestilence* in the *Summer* following; For *Putrefaction* doth not rise to his height at once.

It were good to lay a *Peece* of *Raw Flesh*, or *Fish*, in the *Open Aire*; And if it Putrefie quickly, it is a *Signe* of a *Disposition* in the *Aire* to *Putrefaction*. And because you cannot be informed, whether the *Putrefaction* be quicke or late, except you compare this *Experiment* with the like *Experiment* in another *Yeare*, it were not amisse in the same *Yeare*, and at the same *Time*, to lay one *Peece* of *Flesh*, or *Fish*, in the *Open Aire*, and another of the same Kinde and Bignesse, within *Doores*: For I Judge, that if a generall *Disposition* be in the *Aire* to Putrefie, the *Flesh*, or *Fish*, will sooner Putrefie abroad, where the *Aire* hath more power, than in the *House*, where it hath lesse, being many wayes corrected. And this *Experiment* would be made about the *End* of *March*: For that *Season* is likest to discover, what the *Winter* hath done; And what the *Summer* following will doe upon the *Aire*. And because the *Aire* (no doubt) receiveth great *Tincture*, and *Infusion* from the *Earth*; It were good to trie that *Exposing* of *Flesh*, or *Fish*, both upon a *Stake* of *Wood*, some height above the *Earth*, and upon the *Flat* of the *Earth*. 805

Take *May-Dew*, and see whether it putrefie quickly, or no? For that likewise may disclose the *Quality* of the *Aire*, and *Vapour* of the *Earth*, more or lesse *Corrupted*. 806

A *Drie March*, and a *Drie May*, portend a *Wholesome Summer*, if there bee a *Showring April* betweene: But otherwise, it is a *Signe* of a *Pestilentiall Yeare*. 807

As the *Discoverie* of the *Disposition* of the *Aire*, is good for the *Prognosticks* of *Wholesome*, and *Vnwholesome Yeares*; So it is of much more use, for the *Choice* of *Places* to dwell in: At the least, for *Lodges*, and *Retiring Places* for *Health*; (For *Mansion Houses* respect *Provisions*, as well as *Health*;) Wherein the *Experiments* above mentioned may serve. 808

But for the *Choice* of *Places*, or *Seats*, it is good to make Triall; not onely of *Aptnesse* of *Aire* to corrupt, but also of the *Moisture* and *Drinesse* of the *Aire*; and the *Temper* of it, in *Heat*, or *Cold*; For that may concerne *Health* diversly. We see that there be some *Houses*, wherein *Sweet Meats* will relent, and *Baked Meats* will mould, more than in others; And *Wainscoats* will will also sweat more; so that they will almost runne with *Water*: All which, (no doubt,) are caused chiefly by the *Moistnesse* of the *Aire*, in those *Seats*. But because it is better to know it, before a *Man* buildeth his *House*, than to finde it after, take the *Experiments* following. 809

Lay *Wooll*, or a *Sponge*, or *Bread*, in the *Place* you would trie, comparing it with some other *Places*; And see whether it doth not moisten, and make the *Wooll*, or *Sponge*, &c. more Ponderous, than the other? And if it doe, you may judge of that Place, as Situate in a *Grosse*, and *Moist Aire*. 810

Because it is certaine, that in some *Places*, either by the *Nature* of the *Earth*, or by the *Situation* of *Woods*, and *Hills*, the *Aire* is more Unequall, than in Others; And *Inequalitie* of *Aire* is ever an Enemy to *Health*; It were good to take two *Weather-Glasses*, Matches in all things, and to set them, for the same Houres of One day, in severall *Places*, where no *Shade* is, nor *Enclosures*: And to marke when you set them, how farre the *Water* commeth; And to compare them, when you come againe, how the *VVater* standeth then: And if you finde them *Vnequall*, you may be sure that the *Place* where the *VVater* is lowest, is in the *VVarmer Aire*, and the other in the *Colder*. And the greater the *Inequalitie* be, of the *Ascent*, or *Descent* of the *VVater*, the greater is the *Inequalitie* of the *Temper* of the *Aire*. 811

812 The *Predictions* likewise of *Cold* and *Long VVinters*, and *Hot* and *Drie Summers*, are good to be knowne; As well for the *Discovery* of the *Causes*, as for divers *Provisions*. That of *Plenty* of *Hawes* and *Heps*, and *Briar-Berries*, hath beene spoken of before. If *VVainscoat*, or *Stone*, that have used to Sweat, be more drie in the Beginning of *VVinter*; Or the *Drops* of the *Eaves* of *Houses* come more slowly downe, than they use; it portendeth a *Hard* and *Frostie VVinter*. The *Cause* is, for that it sheweth an *Inclination* of the *Aire*, to *Drie VVeather*; which in *Winter* is ever joyned with *Frost*.

813 Generally, a *Moist* and a *Coole Summer*, portendeth a *Hard VVinter*. The *Cause* is, for that the *Vapours* of the *Earth*, are not dissipated in the *Summer*, by the *Sunne*; And so they rebound upon the *VVinter*.

814 A *Hot* and *Drie Summer*, and *Autumne*, and especially if the *Heat* and *Drought* extend farre into *September*, portendeth an Open Beginning of *VVinter*; And *Colds* to succeed, toward the latter Part of the *VVinter*, and the Beginning of the *Spring*: For till then, the former *Heat* and *Drought* beare the Sway; And the *Vapours* are not sufficiently Multiplied.

815 An *Open* and *VVarme VVinter* portendeth a *Hot* and *Drie Summer*: For the *Vapours* disperse into the *VVinter Showers*; Whereas *Cold* and *Frost* keepeth them in, and transporteth them into the late *Spring*, and *Summer* following.

816 *Birds* that use to change *Countries*, at certaine *Seasons*, if they come Earlier, doe shew the *Temperature* of *VVeather*, according to that *Countrie* whence they came: As the *VVinter-Birds*, (namely, *VVoodcocks*, *Feldefares*, &c.) if they come earlier, and out of the *Northerne Countries*, with us shew *Cold VVinters*. And if it be in the same *Countrey*, then they shew a *Temperature* of *Season*, like unto that *Season* in which they come: As *Swallowes*, *Bats*, *Cuckoes*, &c. that come towards *Summer*, if they come early, shew a *Hot Summer* to follow.

817 The *Prognosticks*, more Immediate, of *VVeather* to follow soone after, are more Certaine than those of *Seasons*. The *Resounding* of the *Sea* upon the *Shoare*; And the *Murmur* of *VVinds* in the *VVoods*, without apparent *VVind*; shew *VVind* to follow: For such *VVinds*, breathing chiefly out of the *Earth*, are not at the first perceived, except they be pent, by *VVater*, or *VVood*. And therefore a *Murmur* out of *Caves* likewise portendeth as much.

818 The *Vpper Regions* of the *Aire*, perceive the *Collection* of the *Matter* of *Tempest*, and *VVinds*, before the *Aire* here below: And therefore the *Obscuring* of the *Smaller Starres* is a *Signe* of *Tempests* following. And of this kind you shall finde a Number of *Instances* in our *Inquisition De Ventis*.

819 *Great Mountaines* have a *Perception* of the *Disposition* of the *Aire* to *Tempests*, sooner than the *Valley's* or *Plaines* below: And therefore they say in *VVales*, when certaine *Hills* have their *Night-Caps* on, they meane Mischiefe. The *Cause* is, for that *Tempests*, which are for the most part bred above, in the *Middle Region*, (as they call it,) are soonest perceived to collect in the *Places* next it.

820 The *Aire*, and *Fire*, have *Subtill Perceptions* of *VVind Rising*, before *Men* finde it. We see the *Trembling* of a *Candle* will discover a *VVind* that otherwise we doe not feele; And the *Flexuous Burning* of *Flames* doth shew the *Aire* beginneth to be unquiet; And so doe *Coales* of *Fire* by casting off the *Ashes* more then they use. The *Cause* is, for that no *VVind*, at the first, till it hath strooke and driven the *Aire*, is Apparent to the *Sense*: But *Flame* is easier to move, than *Aire*: And for the *Ashes*, it is no marvell, though *VVind* unperceived shake them off; For wee usually trie, which way the *VVind* bloweth,

bloweth, by casting up *Grasse*, or *Chaffe*, or such light things into the *Aire*.

When *Wind* expireth from under the *Sea*; As it causeth some *Resounding* of the *Water*, (whereof we spake before,) so it causeth some *Light Motions* of *Bubbles*, and *White Circles* of *Froth*. The *Cause* is, for that the *Wind* cannot be perceived by the *Sense*, untill there be an *Eruption* of a great *Quantity*, from under the *Water*; And so it getteth into a *Body*: Whereas in the first *Putting up* it commeth in little Portions. 821

We spake of the *Ashes*, that *Coales* cast off; And of *Grasse*, and *Chaffe* carried by the *Wind*; So any *Light Thing* that moveth, when we finde no *Wind*, sheweth a *Wind* at hand: As when *Feathers*, or *Downe* of *Thistles*, fly to and fro in the *Aire*. 822

For *Prognosticks* of *VVeather* from *Living Creatures*, it is to be noted; That *Creatures* that live in the *Open Aire*, (*Sub Dio*,) must needs have a Quicker *Impression* from the *Aire*, than *Men* that live most within *Doores*; And especially *Birds* who live in the *Aire*, freest, and Clearest; And are aptest by their *Voice* to tell Tales, what they finde; And likewise by the *Motion* of their *Flight* to expresse the same.

Water-Fowles, (as *Sea-Gulls*, *More-Hens*, &c.) when they flocke and flie together, from the *Sea* towards the *Shores*; And contrariwise, *Land-Birds*, (as *Crowes*, *Swallowes*, &c.) when they fly from the *Land* to the *Waters*, and beat the *Waters* with their *Wings*; doe fore-shew *Raine*, and *Wind*. The *Cause* is, *Pleasure*, that both Kindes take in the *Moistnesse*, and *Densitie* of the *Aire*: And so desire to be in *Motion*, and upon the *Wing*, whithersoever they would otherwise goe: For it is no Marvell, that *Water-Fowle* doe joy most in that *Aire*, which is likest *Water*; And *Land-Birds*, also, (many of them,) delight in *Bathing*, and *Moist Aire*. For the same Reason also, many *Birds* doe proine their *Feathers*; And *Geese* doe gaggle; And *Crowes* seeme to call upon *Raine*: All which is but the Comfort they seeme to receive in the *Relenting* of the *Aire*. 823

The *Heron*, when she soareth high, (so as sometimes she is seene to passe over a *Cloud*,) sheweth *Winds*: But *Kites* flying aloft, shew *Faire* and *Drie Weather*. The *Cause* may be, for that they both mount most into the *Aire*, of that Temper, wherein they delight: And the *Heron*, being a *Water-Fowle*, taketh pleasure in the *Aire*, that is Condensed: And besides, being but Heavy of *Wing*, needeth the Help of the *Grosser Aire*. But the *Kite* affecteth not so much the *Grossenesse* of the *Aire*, as the *Cold* and *Freshnesse* thereof; For being a *Bird* of *Prey*, and therefore *Hot*, she delighteth in the *Fresh Aire*; And (many times) flyeth against the *Wind*; As *Trouts*, and *Salmons* swimme against the Streame. And yet it is true also, that all *Birds* finde an Ease in the depth of the *Aire*; As *Swimmers* doe in a Deepe *Water*. And therefore when they are aloft, they can uphold themselves with their *Wings Spred*, scarce moving them. 824

Fishes, when they play towards the *Top* of the *Water*, doe commonly foretell *Raine*. The *Cause* is, for that a *Fish* hating the *Drie*, will not approach the *Aire*, till it groweth *Moist*; And when it is *Dry*, will fly it, and *Swimme* lower. 825

Beasts doe take Comfort, (generally,) in a *Moist Aire*; And it maketh them eat their *Meat* better: And therefore *Sheepe* will get up betimes in the 826

the Morning, to feed, against *Raine:* And *Cattell*, and *Deere*, and *Conn-ys*, will feed hard before *Raine:* And a *Heifer*, will put up his *Nose*, and snuffe in the *Aire*, against *Raine*.

827 The *Trifoile*, against *Raine*, swelleth in the *Stalke*; and so standeth more upright; For by *Wet*, *Stalkes* doe erect, and *Leaves* bow downe. There is a Small Red *Flower* in the *Stubble-Fields*, which Countrey People call the *Wincopipe*; Which if it open in the *Morning*, you may be sure of a faire *Day* to follow.

828 Even in *Men*, *Aches*, and *Hurts*, and *Cornes*, doe engrieve, either towards *Raine*, or towards *Frost:* For the One maketh the *Humours* more to Abound; And the Other maketh them Sharper. So we see both *Extremes* bring the *Gout*.

829 *Wormes*, *Vermine*, &c. doe fore-shew (likewise) *Raine:* For *Earth-Wormes* will come forth, and *Moules* will cast up more, and *Fleas* bite more, against *Raine*.

830 *Solide Bodies* likewise fore-shew *Raine*. As *Stones*, and *Wainscot*, when they *Sweat:* And *Boxes*, and *Pegges* of *Wood*, when they Draw, and *Wind hard*; Though the Former be but from an Outward Cause; For that the *Stone*, or *Wainscot*, turneth and beateth back the *Aire* against it selfe; But the latter is an *Inward Swelling* of the *Body* of the *Wood* it selfe.

Experiment Solitary, touching the *Nature* of *Appetite* in the *Stomach*.

831 *Appetite* is moved chiefly by Things that are *Cold*, and *Dry*; The *Cause* is, for that *Cold* is a Kinde of *Indigence* of *Nature*, and calleth upon Supply; And so is *Drinesse:* And therefore all *Soure Things*, (as *Vinegar*, *Iuyce* of *Limons*, *Oyle* of *Vitriol*, &c.) provoke *Appetite*. And the *Disease* which they call *Appetitus Caninus*, consisteth in the *Matter* of an *Acide* and *Glassy Flegme*, in the *Mouth* of the *Stomach*. *Appetite* is also moved by *Soure Things*; For that *Soure Things*, induce a *Contraction* in the *Nerves*, placed in the *Mouth* of the *Stomach*; which is a great *Cause* of *Appetite*. As for the *Cause*, why *Onyons*, and *Salt*, and *Pepper*, in Baked Meats, move *Appetite*, it is by *Vellication* of those *Nerves*; For *Motion* whetteth. As for *Worme Wood*, *Olives*, *Capers*, and others of that kinde, which participate of *Bitternesse*, they move *Appetite* by *Abstersion*. So as there bee foure Principall *Causes* of *Appetite*; The *Refrigeration* of the *Stomach* joyned with some *Drinesse*; *Contraction*; *Vellication*; And *Abstersion:* Besides *Hunger*, which is an *Emptinesse:* And yet *Over-Fasting* doth (many times) cause the *Appetite* to cease; For that *Want* of *Meat* maketh the *Stomach* draw *Humours*; And such *Humours* as are Light, and Cholericke, which quench *Appetite* most.

Experiment Solitary, touching *Sweetnesse* of *Odour* from the *Rainbow*.

832 It hath beene observed by the *Ancients*, that where a *Raine-Bow* seemeth to hang over, or to touch, there breatheth forth a *Sweet Smell*. The *Cause* is, for that this happeneth but in certain Matters, which have in themselves some *Sweetnesse*; Which the *Gentle Dew* of the *Raine-Bow* doth draw forth: And the like doe *Soft Showers*; For they also make the *Ground* Sweet: But none are so delicate as the *Dew* of the *Rain-Bow*, where it falleth. It may be also, that the *Water* it selfe hath some *Sweetnesse:* For the *Raine-Bow* consisteth of a *Glomeration* of *Small Drops*, which cannot possibly fall, but from the *Aire*, that is very *Low:* And therefore may hold the very *Sweetnesse* of the *Herbs*, and *Flowers*, as a *Distilled Water:* For *Raine*, and other *Dew*, that fall from high, cannot preserve the Smell, being dissipated in the drawing up: neither doe we know, whether some *Water* it selfe may not have some degree of *Sweetnesse*. It is true, that wee finde it sensibly in no *Poole*, *River*, nor

nor *Fountaine*; But good *Earth*, newly turned up, hath a *Freshnesse*, and good *Sent*; Which *water*, if it be not too *Equall*, (For *Equall Objects* never move the *Sense*,) may also have. Certaine it is, that *Bay-Salt*, which is but a kinde of *Water Congealed*, will sometimes smell like *Violets*.

Experiment Solitary, touching *Sweet Smells*. 833

TO *Sweet Smells Heat* is requisite, to Concoct the *Matter*; And some *Moisture* to Spread the *Breath* of them. For *Heat*, we see that *Woods*, and *Spices*, are more *Odorate* in the *Hot Countries*, than in the *Cold*: For *Moisture*, wee see that Things too much Dried, lose their *Sweetnesse*: And *Flowers* growing, smell better in a *Morning*, or *Evening*, than at *Noone*. Some *Sweet Smells* are destroyed by Approach to the *Fire*; As *Violets*, *Wall-Flowers*, *Gilly-Flowers*, *Pincks*; And generally all *Flowers* that have *Coole* and *Delicate Spirits*. Some continue both on the *Fire*, and from the *Fire*; As *Rose-Water*, &c. Some doe scarce come forth, or at least not so pleasantly, as by means of the *Fire*; as *Iuniper*, *Sweet Gums*, &c. And all *Smells*, that are Enclosed in a *Fast Body*: But (generally) those *Smells* are the most Gratefull, where the *Degree* of *Heat* is Small; Or where the *Strength* of the *Smell* is allayed; For these *Things* doe rather wooe the *Sense*, than Satiate it. And therefore the *Smell* of *Violets*, and *Roses* exceedeth in *Sweetnesse* that of *Spices*, and *Gummes*; And the Strongest Sort of *Smells*, are best in a west, afarre off.

Experiment Solitary, touching the *Corporeall Substance* of *Smells*. 834

IT is certaine, that no *Smell* issueth, but with *Emission* of some *Corporeall Substance*; Not as it is in *Light*, and *Colours*, and in *Sounds*. For we see plainly, that *Smell* doth spread nothing that distance, that the other doe. It is true, that some *Woods* of *Orenges*, and *Heathes* of *Rose-Mary*, will Smell a great way into the *Sea*, perhaps twenty Miles; But what is that, since a *Peale* of *Ordnance* will doe as much, which moveth in a small compasse? Whereas those *Woods*, and *Heathes*, are of Vast Spaces: Besides, we see that *Smells* doe adhere to *Hard Bodies*; As in *Perfuming* of *Gloves*, &c. which sheweth them *Corporeall*; And doe Last a great while, which *Sounds*, and *Light* doe not.

Experiment Solitary, touching *Fetide* and *Fragrant Odours*. 835

THe *Excrements* of most *Creatures* Smell ill; Chiefly to the same *Creature* that voideth them: For we see, besides that of *Man*, that *Pigeons*, and *Horses* thrive best, if their *Houses*, and *Stables* be kept Sweet; And so of *Cage-Birds*: And the *Cat* buryeth that which she voideth: And it holdeth chiefly in those *Beasts*, which feed upon *Flesh*. *Dogs* (almost) onely of *Beasts* delight in *Fetide Odours*; Which sheweth there is somewhat in their *Sense* of *Smell*, differing from the *Smells* of other *Beasts*: But the *Cause*, why *Excrements* smell ill, is manifest; For that the *Body* it selfe rejecteth them; Much more the *Spirits*: And wee see, that those *Excrements* that are of the *First Digestion*, Smell the worst; As the *Excrements*, from the *Belly*: Those that are from the *Second Digestion*, lesse ill; As *Vrine*; And those that are from the *Third*, yet lesse; For *Sweat* is not so bad, as the other two; Especially of some *Persons*, that are full of *Heat*. Likewise most *Putrefactions* are of an *Odious Smell*: For they smell either *Fetide*, or *Mouldy*. The *Cause* may bee, for that *Putrefaction* doth bring forth such a *Consistence*, as is most Contrary to the *Consistence* of the *Body*, whilest it is Sound: For it is a meere dissolution of that *Forme*. Besides, there is another Reason which is Profound: And it is, that the *Objects* that please any of the *Senses*, have (all) some *Equalitie*, and (as it were) *Order* in their *Composition*: But where those are wanting, the *Object* is ever Ingrate. So *Mixture* of many *Disagreeing Colours*

is

is ever unpleasant to the *Eye*: *Mixture* of *Discordant Sounds* is unpleasant to the *Eare*: *Mixture*, or *Hotch-Potch* of many *Tastes*, is unpleasant to the *Taste*: *Harshnesse* and *Ruggednesse* of *Bodies*, is unpleasant to the *Touch*: Now it is certaine, that all *Putrefaction*, being a *Dissolution* of the first *Forme*, is a meere *Confusion*, and *Vnformed Mixture* of the *Part*. Nevertheless, it is strange, and seemeth to Crosse the former *Observation*, that some *Putrefactions* and *Excrements* doe yeeld excellent *Odours*; As *Civet*, and *Muske*; And as some thinke *Amber-Greece*: For divers take it, (though unprobably,) to come from the *Sperme* of *Fish*: And the *Mosse* we spake off from *Apple-Trees*, is little better than an *Excretion*. The Reason may be, for that there passeth in the *Excrements*, and remaineth in the *Putrefactions*, some good *Spirits*; especially where they proceed from *Creatures*, that are very *Hot*. But it may bee also joyned with a further *Cause*, which is more Subtill; And it is, that the *Senses* love not to be Over-pleased; But to have a *Commixture* of somewhat that is in it selfe Ingrate. Certainly, we see how *Discords* in *Musicke*, falling upon *Concords*, make the *Sweetest Straines*: And wee see againe, what Strange *Tastes* delight the *Taste*; As *Red-Herrings*, *Caviary*, *Parmizan*, &c. And it may be, the same holdeth in *Smells*. For those kinde of *Smells*, that wee have mentioned, are all Strong, and doe Pull and Vellicate the *Sense*. And we finde also, that *Places* where Men *Vrine*, commonly have some *Smell* of *Violets*: And *Vrine*, if one hath eaten *Nutmeg*, hath so too.

The Sloathfull, Generall, and Indefinite *Contemplations*, and *Notions*, of the *Elements*, and their *Conjugations*; Of the *Influences* of *Heaven*; Of *Heat*, *Cold*, *Moisture*, *Drought*, *Qualities Active*, *Passive*; and the like; have swallowed up the true *Passages*, and *Processes*, and *Affects*, and *Consistences* of *Matter*, and *Naturall Bodies*. Therefore they are to bee set aside, being but *Notionall*, and *ill Limited*; And Definite *Axiomes* are to bee drawne out of *Measured Instances*: And so Assent to be made to the more *Generall Axiomes*, by *Scale*. And of these Kindes of *Processes* of *Natures*, and *Characters* of *Matter*, we will now set downe some *Instances*.

Experiment Solitary, touching the *Causes* of *Putrefaction*.

836 ALL *Putrefactions* come chiefly from the *Inward Spirits* of the *Body*; And partly also from the *Ambient Body*, be it *Aire*, *Liquour*, or whatsoever else. And this last, by two *Means*: Either by *Ingresse* of the *Substance* of the *Ambient Bodie*, into the *Body Putrified*; Or by *Excitation* and *Sollicitation* of the *Body Putrified*, and the *Parts* thereof, by the *Body Ambient*. As for the Received Opinion, that *Putrefaction* is caused, either by *Cold*, or *Peregrine* and *Preternaturall Heat*, it is but Nugation: For *Cold* in *Things Inanimate*, is the greatest Enemy that is, to *Putrefaction*; though it extinguisheth *Vivification*, which ever consisteth in *Spirits Attenuate*, which the *Cold* doth congeale, and coagulate. And as for the *Peregrine Heat*, it is thus farre true; That if the *Proportion* of the *Adventine Heat*, be greatly Predominant, to the *Naturall Heat* and *Spirits* of the *Body*, it tendeth to *Dissolution*, or Notable *Alteration*. But this is wrought by *Emission*, or *Suppression*, or *Suffocation*, of the *Native Spirits*; And also by the *Disordination*, and *Discomposture* of the *Tangible Parts*; And other *Passages* of *Nature*; And not by a *Conflict* of *Heats*.

In

IN *Versions*, or *Maine Alterations* of *Bodies*, there is a *Medium* between the *Body*, as it is at first, and the *Body Resulting*; which *Medium* is *Corpus imperfectè Mistum*, and is Transitory, and not durable; As *Mists*, *Smoakes*, *Vapours*, *Chylus* in the *Stomach*, *Living Creatures* in the first *Vivification*: And the *Middle Action*, which produceth such *Imperfect Bodies*, is fitly called, (by some of the *Ancients*,) *Inquination*, or *Inconcoction*, which is a Kinde of *Putrefaction*; For the *Parts* are in *Confusion*, till they settle, one way, or other.

Experiment Solitary, touching *Bodies Vnperfectly Mixt.* 837

THe word *Concoction*, or *Digestion*, is chiefly taken into use from *Living Creatures*, and their *Organs*; And from thence extended to *Liquours*, and *Fruits*, &c. Therefore they speake of *Meat Concocted*; *Vrine* and *Excrements Concocted*; And the *Foure Disgestions*, (In the *Stomach*; In the *Liver*; In the *Arteries* and *Nerves*; And in the *Severall Parts* of the *Body*;) are likewise called *Concoctions*: And they are all made to be the Workes of *Heat*: All which *Notions* are but ignorant Catches of a few Things, which are most Obvious to *Mens Observations*. The Constantest *Notion* of *Concoction* is, that it should signifie the *Degrees* of *Alteration*, of one *Body* into another, from *Crudity* to *Perfect Concoction*; Which is the *Vltimitie* of that *Action*, or *Processe*: And while the *Body* to be *Converted* and *Altered*, is too strong for the *Efficient*, that should *Convert*, or *Alter* it, (whereby it resisteth and holdeth fast in some degree the first *Forme*, or *Consistence*,) it is (all that while,) *Crude*, and *Inconcoct*; And the *Processe* is to be called *Cruditie* and *Inconcoction*. It is true, that *Concoction* is, in great part, the *Worke* of *Heat*; But not the *Worke* of *Heat* alone: For all Things, that further the *Conversion*, or *Alteration*, (as *Rest*, *Mixture* of a *Body* already *Concocted*, &c.) are also *Meanes* to *Concoction*. And there are of *Concoction* two *Periods*; The one *Assimilation*, or *Absolute Conversion* and *Subaction*; The other *Maturation*: whereof the Former is most conspicuous in the *Bodies* of *Living Creatures*; In which there is an *Absolute Conversion*, and *Assimilation* of the *Nourishment* into the *Body*: And likewise in the *Bodies* of *Plants*: And againe in *Metalls*, where there is a full *Transmutation*. The other, (which is *Maturation*,) is seene in *Liquours*, and *Fruits*; wherin there is not desired, nor pretended, an utter *Conversion*, but onely an *Alteration* to that *Forme*, which is most sought, for *Mans* use; As in *Clarifying* of *Drinkes*; *Ripening* of *Fruits*, &c. But note, that there bee two Kindes of *Absolute Conversions*; The one is, when a *Body* is converted into another *Body*, which was before; As when *Nourishment* is turned into *Flesh*; That is it which we call *Assimilation*. The other is, when the *Conversion* is into a *Body* meerely New, and which was not before; As if *Silver* should be turned to *Gold*; or *Iron* to *Copper*: And this *Conversion* is better called, for distinction sake, *Transmutation*.

Experiment Solitary, touching *Concoction* and *Crudity*. 838

THere are also divers other *Great Alterations* of *Matter*, and *Bodies*, besides those that tend to *Concoction*, and *Maturation*; For whatsoever doth so alter a *Body*, as it returneth not againe to that it was, may bee called *Alteratio Major*: As when *Meat* is Boyled, or Rosted, or Fried, &c. Or when *Bread* and *Meat* are Baked; Or when *Cheese* is made of Curds, or *Butter* of *Creame*, or *Coales* of wood, or *Bricks* of Earth; And a Number of others. But to apply *Notions Philosophicall* to *Plebeian Termes*; Or to say, where the *Notions* cannot fitly be reconciled, that there wanteth a *Terme*, or *Nomenclature* for it; (as the *Ancients* used;) They bee but Shifts of *Ignorance*; For

Experiment Solitary, touching *Alterations*, which may be called *Majors*. 839

Knowledge

Knowledge will bee ever a *Wandring* and *Indigested Thing*, if it bee but a *Commixture* of a few *Notions*, that are at hand and occurre, and not excited from sufficient Number of Instances, and those well collated.

The *Consistences* of *Bodies* are very Divers: *Dense*, *Rare*, *Tangible*, *Pneumaticall*; *Volatile*, *Fixed*; *Determinate*, *Not Determinate*, *Hard*, *Soft*; *Cleaving*, Not *Cleaving*; *Congeleable*, *Not Congeleable*; *Liquefiable*, Not *Liquefiable*; *Fragile*, *Tough*; *Flexible*, *Inflexible*; *Tractile*, or to be drawne forth in length, *Intractile*; *Porous*, *Solide*; *Equall*, and *Smooth*, *Vnequall*; *Venous*, and *Fibrous*, and with *Graines*, *Entire*; And divers Others; All which to referre to *Heat*, and *Cold*; and *Moisture*, and *Drought* is a Compendious and Inutile *Speculation*. But of these see principally our *Abecedarium Naturæ*; And otherwise *Sparsim* in this our *Sylva Sylvarum*: Nevertheless in some good part, Wee shall handle divers of them now presently.

Experiment Solitary, touching *Bodies Liquefiable*, and *not Liquefiable*.
840

Liquefiable, and *Not Liquefiable*, proceed from these *Causes*: *Liquefaction* is ever caused by the *Detention* of the *Spirits*, which play within the *Body*, and Open it. Therefore such *Bodies*, as are more *Turgide* of *Spirit*; Or that have their *Spirits* more *Strainly Imprisoned*; Or againe that hold them *Better Pleased* and *Content*; are *Liquefiable*: for these three *Dispositions* of *Bodies*, doe arrest the *Emission* of the *Spirits*. An Example of the first two *Properties* is in *Metalls*; And of the last in *Grease*, *Pitch*, *Sulphure*, *Butter*, *Waxe*, &c. The *Disposition* not to *Liquefie* proceedeth from the *Easie Emission* of the *Spirits*, whereby the *Grosser Parts* contract; And therefore, *Bodies Iejune* of *Spirits*; Or which part with their *Spirits* more *Willingly*; are not *Liquefiable*; As *Wood*, *Clay*, *Free-Stone*, &c. But yet, even many of those *Bodies*, that will not *Melt*, or will hardly *Melt*, will notwithstanding *Soften*; As *Iron* in the Forge; And a *Sticke* bathed in Hot Ashes, which thereby becommeth more Flexible. Moreover, there are some *Bodies*, which doe *Liquefie*, or dissolve by *Fire*; As *Metalls*, *Waxe*, &c. And other *Bodies*, which dissolve in *Water*; As *Salt*, *Sugar*, &c. The *Cause* of the former proceedeth from the *Dilatation* of the *Spirits* by *Heat*: The *Cause* of the Latter proceedeth from the *Opening* of the *Tangible Parts*, which desire to receive the *Liquour*. Againe, there are some *Bodies*, that dissolve with both; As *Gumme*, &c. And those bee such *Bodies*, as on the One Side have good store of *Spirit*; And on the other Side, have the *Tangible Parts Indigent* of *Moisture*; For the former helpeth to the *Dilating* of the *Spirits* by the *Fire*; And the Latter Stimulateth the Parts to Receive the *Liquor*.

Experiment Solitary, touching *Bodies Fragile*, and *Tough*.
841

OF *Bodies* some are *Fragile*; And some are *Tough*, and *Not Fragile*; And in the *Breaking*, some *Fragile Bodies* break but where the *Force* is; Some shatter and flie in many Peeces. Of *Fragility* the *Cause* is an *Impotency* to bee *Extended*: And therefore *Stone* is more *Fragile* than *Metall*; And so *Fictile Earth* is more *Fragile* than *Crude Earth*; And *Dry VVood* than *Greene*. And the *Cause* of this *Vnaptnesse* to *Extension*, is the *Small Quantity* of *Spirits*; (For it is the *Spirit* that furthereth the *Extension* or *Dilatation* of *Bodies*;) And it is ever Concomitant with *Porosity*, and with *Drinesse* in the *Tangible Parts*:

Contrariwise,

Contrariwise, *Tough Bodies* have more *Spirit*, and fewer *Pores*, and *Moister Tangible Parts*: Therefore we see that *Parchment*, or *Leather* will stretch, *Paper* will not; *Woollen Cloth* will tenter, *Linnen* scarcely.

ALL *Solide Bodies* consist of *Parts* of two severall *Natures*; *Pneumaticall*, and *Tangible*; And it is well to be noted, that the *Pneumaticall Substance* is in some *Bodies*, the *Native Spirit* of the *Bodie*; And in some other, plaine *Aire* that is gotten in; As in *Bodies desiccate*, by *Heat*, or *Age*: For in them, when the *Native Spirit* goeth forth, and the *Moisture* with it, the *Aire* with time getteth into the *Pores*. And those *Bodies* are ever the more *Fragile*; For the *Native Spirit* is more *Yeelding*, and *Extensive*, (especially to follow the *Parts*,) than *Aire*. The *Native Spirits* also admit great Diversitie; As *Hot*, *Cold*, *Active*, *Dull*, &c. Whence proceed most of the *Vertues*, and *Qualities* (as we call them) of *Bodies*: But the *Aire Intermixt*, is without *Vertues*, and maketh Things *Insipide*, and without any *Extimulation*.

Experiment Solitary, touching the *Two Kinds* of *Pneumaticals* in *Bodies*. 842

THe *Concretion* of *Bodies* is (commonly) solved by the *Contrary*; As *Ice*, which is congealed by *Cold*, is dissolved by *Heat*; *Salt* and *Sugar*, which are Excocted by *Heat*, are Dissolved by *Cold*, and *Moisture*. The *Cause* is, for that these *Operations*, are rather *Returnes* to their former *Nature*, than *Alterations*: So that the *Contrary* cureth. As for *Oyle*, it doth neither easily congeale with *Cold*, nor thicken with *Heat*. The *Cause* of both *Effects*, though they be produced by Contrary *Efficients*, seemeth to be the Same; And that is, because the *Spirit* of the *Oyle*, by either Meanes, exhaleth little; For the *Cold* keepeth it in; and the *Heat*, (except it bee Vehement,) doth not call it forth. As for *Cold*, though it take hold of the *Tangible Parts*, yet as to the *Spirits*, it doth rather make them Swell, than Congeale them: As when *Ice* is congealed in a *Cup*, the *Ice* will Swell in stead of Contracting; And sometimes Rift.

Experiment Solitary, touching *Concretion*, and *Dissolution* of *Bodies*. 843

OF *Bodies*, some (we see) are *Hard*, and some *Soft*: The *Hardnesse* is caused (chiefly) by the *Iejuneness* of the *Spirits*; And their *Imparity* with the *Tangible Parts*: Both which if they be in a greater degree, maketh them not onely *Hard*, but *Fragile*, and lesse Enduring of *Pressure*; As *Steele*, *Stone*, *Glasse*, *Drie Wood*, &c. *Softnesse* commeth (contrariwise) by the Greater *Quantity* of *Spirits*; (which ever helpeth to Induce *Yeelding* and *Cession*;) And by the more *Equall Spreading* of the *Tangible Parts*, which thereby are more *Sliding*, and *Following*; As in *Gold*, *Lead*, *Wax*, &c. But note, that *Soft Bodies*, (as we use the word,) are of two *Kinds*; The one, that easily giveth place to another *Body*, but altereth not *Bulke*, by Rising in other *Places*: And therefore we see that *Wax*, if you put any Thing into it, doth not rise in *Bulke*, but onely giveth Place: For you may not thinke, that in *Printing* of *Wax*, the *Wax* riseth up at all; But onely the *depressed Part* giveth place, and the other remaineth as it was. The other that altereth *Bulke* in the *Cession*, As *Water*, or other *Liquours*, if you put a *Stone*, or any Thing into them, they give place (indeed) easily, but then they rise all over: Which is a False *Cession*; For it is in *Place*, and not in *Body*.

Experiment Solitary, touching *Hard* and *Soft Bodies*. 844

ALL *Bodies Ductile*, and *Tensile*, (as *Metals* that will be drawne into *Wires*; *Wooll* and *Towe* that will be drawne into *Yarne*, or *Thred*; have in them the *Appetite* of *Not Discontinuing*, Strong; Which maketh them follow the Force, that pulleth them out; And yet so, as not *Discontinue* or forsake

Experiment Solitary, touching *Bodies Ductile*, and *Tensile*. 845

forsake their owne *Body*. *Viscous Bodies*, (likewise,) as *Pitch*, *Wax*, *Bird-Lime*, *Cheese toasted*, will draw forth, and roape. But the difference betweene *Bodies Fibrous*, and *Bodies Viscous*, is Plaine; For all *Wooll*, and *Tow*, and *Cotton*, and *Silke*, (especially raw *Silke*,) have, besides their desire of *Continuance*, in regard of the *Tenuitie* of their *Thred*, a *Greedinesse* of *Moisture*; And by *Moisture* to joyne and incorporate with other *Thred*; Especially if there bee a little *Wreathing*; As appeareth by the *Twisting* of *Thred*; And the Practice of *Twirling* about of *Spindles*. And we see also, that *Gold* and *Silver Thred* cannot be made without *Twisting*.

Experiment Solitary, touching other *Passions* of *Matter*, and *Characters* of *Bodies*.

846

THe *Differences* of *Impressible* and *Not Impressible*, *Figurable*, and not *Figurable*; *Mouldable*, and *Not Mouldable*; *Scissible* and *Not Scissible*; and many other *Passions* of *Matter*, are *Plebeian Notions*, applied unto the *Instruments* and *Vses* which Men ordinarily practise; But they are all but the *Effects* of some of these *Causes* following; Which we will Enumerate without Applying them, because that would bee too long. The First is the *Cession*, or *Not Cession* of *Bodies*, into a *Smaller Space* or *Roome*, keeping the Outward *Bulke*, and not flying up. The Second is the *Stronger* or *Weaker Appetite*, in *Bodies*, to *Continuitie*, and to flie *Discontinuitie*. The Third is the *Disposition* of *Bodies*, to *Contract*, or *Not Contract*; And againe, to *Extend*, or *Not Extend*. The Fourth is the *Small Quantity*, or *Great Quantity*, of the *Pneumaticall* in *Bodies*. The Fifth is the *Nature* of the *Pneumaticall*, whether it bee *Native Spirit* of the *Body*, or *Common Aire*. The Sixth is, the *Nature* of the *Native Spirits* in the *Body*, whether they be *Active* and *Eager*, or *Dull* and *Gentle*. The Seventh is the *Emission* or *Detention* of the *Spirits* in *Bodies*. The Eighth is the *Dilatation*, or *Contraction* of the *Spirits* in *Bodies*, while they are detained. The Ninth is the *Collocation* of the *Spirits* in *Bodies*; whether the *Collocation* be *Equall*, or *Vnequall*; And againe, whether the *Spirits* be *Coacervate*, or *Diffused*. The Tenth is the *Densitie*, or *Rarity* of the *Tangible Parts*. The Eleventh is the *Equalitie* or *Inequality* of the *Tangible Parts*. The Twelfth is the *Digestion*, or *Cruditie* of the *Tangible Parts*. The Thirteenth is the *Nature* of the *Matter*, whether *Sulphureous*, or *Mercuriall*, *Watrie* or *Oilie*, *Drie* and *Terrestriall*, or *Moist* and *Liquid*; which *Natures* of *Sulphureous* and *Mercuriall*, seeme to be *Natures Radicall*, and *Principall*. The Fourteenth is the *Placing* of the *Tangible Parts*, in *Length* or *Transverse*; (As it is in the *Warp*, and the *Woofe*, of *Textiles*;) *More Inward*, or *More Outward*, &c. The Fifteenth is the *Porositie*, or *Imporosity* betwixt the *Tangible Parts*; And the *Greatnesse*, or *Smalnesse* of the *Pores*. The Sixteenth is the *Collocation* and *Posture* of the *Pores*. There may be more *Causes*; But these doe occure for the Present.

Experiment Solitary, touching *Induration* by *Sympathy*.

847

TAke *Lead*, and melt it, and in the Middest of it, when it beginneth to Congeale, make a little Dint, or Hole, and put *Quick-Silver* wrapped in a Peece of *Linnen* into that Hole, and the *Quick-Silver* will fix, and runne no more, and endure the Hammer. This is a Noble *Instance* of *Induration*, by *Consent* of one *Body* with another, and *Motion* of *Excitation* to *Imitate*; For to ascribe it onely to the *Vapour* of *Lead*, is lesse Probable. *Quære* whether the *Fixing* may be in such a degree, as it will be Figured like other *Metalls*? For if so, you may make Workes of it for some purposes, so they come not neare the *Fire*.

Experiment Solitary, touching *Honey* and *Sugar*. 848

Sugar hath put downe the use of *Honey*; Insomuch as we have lost those *Observations*, and *Preparations* of *Honey*, which the *Ancients* had, when it was more in Price. First, it seemeth that there was, in old time, *Tree-Honey*, as well as *Bee-Honey*; Which was the *Teare* or *Bloud* issuing from the *Tree*: Insomuch as one of the *Ancients* relateth, that in *Trebisond*, there was *Honey* issuing from the *Box-Trees*, which made *Men* Mad. Againe, in Ancient time, there was a Kinde of *Honey*, which either of the owne Nature, or by Art, would grow as Hard as *Sugar*; And was not so Lushious as Ours. They had also a *Wine* of *Honey*, which they made thus. They crushed the *Honey* into a great *Quantity* of *Water*, and then strained the *Liquour*; After they boyled it in a Copper to the halfe: Then they powred it into *Earthen Vessells*, for a small time; And after turned it into *Vessels* of *Wood*, and kept it for many yeares. They have also, at this day, in *Russia*, and those *Northerne Countries*, *Mead Simple*, which (well made, and seasoned) is a good wholesome *Drinke*, and very Cleare. They use also in *Wales*, a Compound *Drinke* of *Mead*, with *Herbs*, and *Spices*. But meane-while it were good, in recompence of that we have lost in *Honey*, there were brought in use a *Sugar-Mead*, (for so we may call it,) though without any *Mixture* at all of *Honey*; And to brew it, and keep it stale, as they use *Mead*; For certainly, though it would not be so *Abstersive*, and *Opening*, and *Solutive* a *Drinke* as *Mead*; yet it will be more gratefull to the *Stomach*, and more *Lenitive*, and fit to bee used in *Sharp Diseases*: For we see, that the use of *Sugar* in *Beere*, and *Ale*, hath good *Effects* in such Cases.

Experiment Solitary, touching the *Finer Sort* of *Base Metals*. 849

It is reported by the *Ancients*, that there was a Kinde of *Steele*, in some places, which would polish almost as white and bright as *Silver*. And that there was in *India* a Kinde of *Brasse*, which (being polished) could scarce be discerned from *Gold*. This was in the *Naturall Vre*; but I am doubtfull, whether Men have sufficiently refined *Metals*, which wee count *Base*; As whether *Iron*, *Brasse*, and *Tinne*, be refined to the Heighth? But when they come to such a Finenesse, as serveth the ordinary use, they trie no further.

Experiment Solitary, touching *Cements* and *Quarries*. 850

There have been found certaine *Cements* under *Earth*, that are very Soft; And yet, taken forth into the *Sunne*, harden as Hard as *Marble*: There are also ordinary *Quarries* in *Summerset-Shire*, which in the *Quarry* cut soft to any bignesse, and in the *Building* prove firme, and hard.

Experiment Solitary, touching the *Altering* of the *Colour* of *Haires* and *Feathers*. 851

Living Creatures (generally) doe change their *Haire* with *Age*, turning to be *Gray*, and *White*: As is seene in *Men*, though some Earlier, some Later; In *Horses*, that are Dappled, and turne *white*; In *Old Squirrels*, that turne *Grisly*; And many Others. So doe some *Birds*; As *Cygnets*, from *Gray* turne *White*; *Hawkes* from *Browne* turne more *White*: And some *Birds* there be, that upon their *Moulting*, doe turne *Colour*; As *Robin-Red-brests*, after their *Moulting* grow to be *Red* againe, by degrees; So doe *Gold-Finches* upon the *Head*. The *Cause* is, for that *Moisture* doth (chiefly) colour *Haire*, and *Feathers*; And *Drinesse* turneth them *Gray* and *White*; Now *Haire* in *Age* waxeth *Drier*: So doe *Feathers*. As for *Feathers*, after *Moulting*, they are *Young Feathers*, and so all one as the *Feathers* of *Young Birds*. So the *Beard* is younger than the *Haire* of the *Head*, and doth (for the most part,) wax *Hoare* later. Out of this Ground, a *Man* may devise the *Means* of *Altering* the *Colour* of *Birds*, and the *Retardation* of *Hoare-Haires*. But of this see the fifth *Experiment*.

Experiment Solitary, touching the *Differences* of *Living Creatures, Male* and *Female*.
852

THe *Difference* betweene *Male* and *Female*, in some *Creatures*, is not to be discerned, otherwise than in the *Parts* of *Generation*: As in *Horses* and *Mares*, *Dogs*, and *Bitches*, *Doves He* and *Shee*, and others. But some differ in *Magnitude*, and that diversly; For in most the *Male* is the greater; As in *Man*, *Pheasants*, *Peacocks*, *Turkey's*; and the like: And in some few, as in *Hawkes*, the *Female*. Some differ in the *Haire*, and *Feathers*, both in the *Quantity*, *Crispation*, and *Colours* of them; As *He-Lions*, are *Hirsute*, and have great *Maines*; The *She's* are smooth like *Cats*. *Bulls* are more *Crispe* upon the *Fore-Head* than *Cowes*; The *Peacock*, and *Pheasant-Cock*, and *Gold-Finch-Cock*, have glorious and fine *Colours*; The *Henn's* have not. Generally, the Hees in *Birds* have the fairest *Feathers*. Some differ in divers *Features*; As *Bucks* have *Hornes*, *Doe's* none; *Rammes* have more *Wreathed Hornes* than *Ewes*; *Cocks* have great *Combes* and *Spurres*. *Hennes* little or none; *Boares* have great *Fangs*, *Sowes* much lesse; The *Turky-Cocke* hath great and Swelling *Gills*, the *Henne* hath lesse; *Men* have generally Deeper and Stronger *Voices* than *Women*. Some differ in *Facultie*; As the *Cocks* amongst *Singing Birds*, are the best *Singers*. The Chiefe *Cause* of all these, (no doubt,) is, for that the *Males* have more Strength of *Heat* than the *Females*; Which appeareth manifestly in this, that all young *Creatures Males*, are like *Females*; And so are *Eunuchs*, and *Gelt Creatures* of all kindes, liker *Females*. Now *Heat* causeth *Greatnesse* of *Growth*, generally, where there is *Moisture* enough to worke upon: But if there be found in any *Creature*, (which is seene rarely,) an Over-great *Heat* in proportion to the *Moisture*, in them the *Female* is the greater; As in *Hawkes*, and *Sparrowes*. And if the *Heat* be ballanced with the *Moisture*, then there is no *Difference* to be seene betweene *Male* and *Female*: As in the *Instances* of *Horses*, and *Dogs*. We see also, that the *Hornes* of *Oxen*, and *Cowes*, for the most part, are Larger than the *Bulls*; which is caused by abundance of *Moisture*, which in the *Hornes* of the *Bull* faileth. Againe, *Heat* causeth *Pilositie*, and *Crispation*; And so likewise *Beards* in *Men*. It also expelleth finer *Moisture*, which want of *Heat* cannot Expell; And that is the *Cause* of the *Beautie* and *Varietie* of *Feathers*: Againe, *Heat* doth put forth many *Excrescences*, and much Solide *Matter*, which Want of *Heat* cannot doe: And this is the *Cause* of *Hornes*, and of the *Greatnesse* of them; And of the *Greatnesse* of the *Combs* & *Spurres* of *Cocks*, *Gills* of *Turkey-Cocks*, and *Fangs* of *Boares*. *Heat* also dilateth the *Pipes*, and *Organs*, which causeth the *Deepnesse* of the *Voice*. Againe, *Heat* refineth the *Spirits*, and that causeth the *Cock-Singing Bird*, to Excell the *Hen*.

Experiment Solitary, touching the *Comparative Magnitude* of *Living Creatures*.
853

THere be *Fishes* greater than any *Beasts*; As the *Whale* is farre greater than the *Elephant*. And *Beasts* are (generally) greater than *Birds*. For *Fishes*, the *Cause* may be, that because they Live not in the *Aire*, they have not their *Moisture* drawne and Soaked by the *Aire*, and *Sunne-Beames*. Also the rest alwayes in a manner, and are supported by the *Water*; whereas *Motion* and *Labour* do consume. As for the *Greatnesse* of *Beasts*, more than of *Birds*, it is caused, for that *Beasts* stay Longer time in the *Womb*, than *Birds*, and there Nourish, and grow; Whereas in *Birds*, after the *Egge* Lay'd, there is no further *Growth*, or *Nourishment* from the *Female*: For the *Sitting* doth *Vivifie*, and not Nourish.

Experiment Solitary, touching *Exossation* of *Fruits*.
854

WE have partly touched before the *Meanes* of *Producing Fruits*, without *Coares*, or *Stones*. And this we adde further, that the *Cause* must be *Abundance* of *Moisture*; For that the *Coare*, and *Stone* are made of a *Drie*

Sap:

Sap: And we ſee, that it is poſſible, to make a *Tree* put forth onely in *Bloſſome*, without *Fruit*; As in *Cherries* with *Double Flowers*; Much more in *Fruit* without *Stone*, or *Coares*. It is reported, that a *Cions* of an *Apple*, grafted upon a *Colewort-Stalke*, ſendeth forth a great *Apple* without a *Coare*. It is not unlikely, that if the *Inward Pith* of a *Tree*, were taken out, ſo that the Juyce came onely by the *Barke*, it would worke the *Effect*. For it hath beene obſerved, that in *Pollards*, if the *Water* get in on the *Top*, and they become Hollow, they put forth the more. We adde alſo, that it is delivered for certaine by ſome, that if the *Cions* be grafted, the Small End downwards, it will make *Fruit* have little or no *Coares*, and *Stones*.

Experiment Solitary, touching the *Melioration* of *Tobacco*. 855

Tobacco is a thing of great Price, if it be in requeſt. For an *Acre* of it will be worth, (as is affirmed,) two Hundred Pounds, by the yeare, towards Charge. The Charge of making the Ground, and otherwiſe, is great, but nothing to the Profit. But the *Engliſh Tobacco*, hath ſmall credit, as being too *Dull*, and *Earthy*: Nay the *Virginian Tobacco*, though that bee in a *Hotter Climate*, can get no credit, for the ſame *Cauſe*: So that a Triall to make *Tobacco* more *Aromaticall*, and better Concocted here in *England*, were a Thing of great profit. Some have gone about to doe it by Drenching the *Engliſh Tobacco*, in a *Decoction* or *Infuſion* of *Indian Tobacco*: But thoſe are but Sophiſtications, and Toyes; For Nothing that is once Perfect, and hath runne his Race, can receive much Amendment. You muſt ever reſort to the Beginnings of Things for *Melioration*. The Way of *Maturation* of *Tobacco* muſt, as in other *Plants*, be, from the *Heat*, Either of the *Earth*, or of the *Sunne*: We ſee ſome Leading of this in Musk-Melons; which are ſowen upon a *Hot Bed*, Dunged below, upon a Banke turned upon the *South Sunne*, to give *Heat* by *Reflexion*; Laid upon *Tiles*, which increaſeth the *Heat*; And Covered with *Straw* to keepe them from *Cold*. They remove them alſo, which addeth ſome *Life*: And by theſe Helps they become as good in *England*, as in *Italy*, or *Provence*. Theſe, and the like Meanes, may be tried in *Tobacco*. Enquire alſo of the *Steeping* of *Roots*, in ſome ſuch *Liquour*, as may give them Vigour to put forth Strong.

Experiment Solitary, touching ſeverall *Heate*, working the ſame *Effects*. 856

Heat of the *Sunne*, for the *Maturation* of *Fruits*; Yea and the *Heat* of *Vivification* of *Living Creatures*; are both repreſented and ſupplyed, by the *Heat* of *Fire*; And likewiſe, the *Heats* of the *Sunne*, and *Life*, are repreſented one by the other. *Trees*, ſet upon the *Backs* of *Chimneyes*, doe ripen *Fruit* ſooner. *Vines*, that have beene drawne in at the Window of a *Kitchen*, have ſent forth *Grapes* ripe a Moneth (at leaſt) before others. *Stoves*, at the Backe of Walls, bring forth *Orenges* here with us. *Egges*, as is reported by ſome, have beene hatched in the warmth of an *Oven*. It is reported by the *Ancients*, that the *Eſtrich* Layeth her *Egges* under *Sand*, where the *Heat* of the *Sunne* diſcloſeth them.

Experiment Solitary, touching *Swelling* and *Dilatation* in *Boyling*. 857

Barley in the *Boyling* ſwelleth not much; *Wheat* ſwelleth more; *Rize* extremely; In ſo much as a Quarter of a Pint (unboyled) will ariſe to a Pint boyled. The *Cauſe* (no doubt) is, for that the more Cloſe and Compact the *Body* is, the more it will dilate: Now *Barley* is the moſt Hollow; *Wheat* more Solide than that; and *Rize* moſt Solide of all. It may bee alſo that ſome *Bodies* have a Kinde of *Lentour*, and more *Depertible Nature* than others; As we ſee it Evident in *Colouration*; For a Small *Quantity* of *Saffron*, will Tinct more, than a very great *Quantity* of *Breſill*, or *Wine*.

Experiment Solitary, touching the *Dulcoration* of *Fruits*.
858

FRuit groweth *Sweet* by *Rowling*, or *Pressing* them gently with the *Hand*; As *Rowling Peares*, *Damasins*, &c. By *Rottennesse*; As *Medlars*, *Services*, *Sloe's*, *Heps*, &c. By *Time*; As *Apples*, *Wardens*, *Pomegranats*, &c. By certaine Speciall *Maturations*; As by *Laying* them in *Hay*, *Straw*, &c. And by *Fire*; As in *Roasting*, *Stewing*, *Baking*, &c. The *Cause* of the *Sweetnesse* by *Rowling*, and *Pressing*, is *Emollition*, which they properly enduce; As in Beating of *Stock-Fish*, *Flesh*, &c. By *Rottennesse* is, for that the *Spirits* of the *Fruit*, by *Putrefaction*, gather *Heat*, and thereby disgest the Harder Part: For in all *Putrefactions*, there is a *Degree* of *Heat*. By *Time* and *Keeping* is, because the *Spirits* of the *Body*, doe ever feed upon the *Tangible Parts*, and attenuate them. By Severall *Maturations* is, by some *Degree* of *Heat*. And by *Fire* is, because it is the Proper Worke of *Heat* to Refine, and to Incorporate; And all *Soureness* consisteth in some *Grossenesse* of the *Body*: And all *Incorporation* doth make the *Mixture* of the *Body*, more *Equall*, in all the *Parts*; Which ever induceth a Milder *Taste*.

Experiment Solitary, touching *Flesh Edible*, and not *Edible*.
859

OF *Flesches*, some are *Edible*; Some, except it bee in *Famine*, not. For those that are not *Edible*, the *Cause* is, for that they have (commonly) too much *Bitternesse* of *Taste*; And therefore those *Creatures*, which are Fierce and Cholerick, are not *Edible*; As *Lions*, *Wolves*, *Squirrels*, *Dogs*, *Foxes*, *Horses*, &c. As for *Kine*, *Sheepe*, *Goats*, *Deere*, *Swine*, *Conneyes*, *Hares*, &c. We see they are *Milde*, and *Fearfull*. Yet it is true, that *Horses*, which are *Beasts* of Courage, have beene, and are eaten by some *Nations*; As the *Scythians* were called *Hippophagi*; And the *Chineses* eat *Horse-flesh* at this day; And some *Gluttons* have used to have *Colts-flesh* baked. In *Birds*, such as are *Carnivoræ*, and *Birds* of *Prey*, are commonly no Good *Meat*; But the Reason is, rather the *Cholerick Nature* of those *Birds*, than their *Feeding* upon *Flesh*; For *Puits*, *Gulls*, *Shovelers*, *Ducks*, doe feed upon *Flesh*, and yet are good *Meat*: And wee see, that those *Birds*, which are of *Prey*, or feed upon *Flesh*, are good *Meat*, when they are very Young; As *Hawkes*, *Rookes* out of the Nest, *Owles*, &c. *Mans Flesh* is not Eaten. The Reasons are Three: First, because *Men* in *Humanity* doe abhorre it: Secondly, because no *Living Creature*, that *Dyeth* of *it selfe*, is good to Eat: And therefore the *Caniballs* (themselves) eat no *Mans-Flesh*, of those that *Die* of *Themselves*, but of such as are *Slaine*. The Third is, because there must be (generally) some *Disparity*, betweene the *Nourishment*, and the *Body Nourished*; And they must not be Over-neare, or like: yet we see, that in great *Weaknesses*, and *Consumptions*, *Men* have beene sustained with *Womans Milke*: And *Ficinus* fondly (as I conceive) adviseth, for the *Prolongation* of *Life*, that a *Veine* bee opened in the *Arme* of some wholesome *Young Man*; And the *Bloud* to be sucked. It is said, that *Witches* doe greedily eat *Mans Flesh*; which if it be true, besides a *Devillish Appetite* in them, it is likely to proceed, for that *Mans flesh* may send up High and Pleasing *Vapours*, which may stirre the *Imagination*; And *Witches* Felicitie is chiefly in *Imagination*, as hath beene said.

Experiment Solitary, touching the *Salamander*.
860

THere is an Ancient Received *Tradition* of the *Salamander*, that it liveth in the *Fire*, and hath force also to extinguish the *Fire*. It must have two Things, if it be true, to this *Operation*: The One a very *Close Skin*, whereby *Flame*, which in the Midst is not so hot, cannot enter: For wee see that if the *Palme* of the *Hand* bee annointed thicke with *White* of *Egge*, and then

then *Aquavitæ* bee poured upon it, and *Enflamed*, yet one may endure the *Flame* a pretty while. The other is some *Extreme Cold* and *Quenching vertue*, in the *Body* of that *Creature*, which choaketh the *Fire*. Wee see that *Milke* quencheth *Wilde-Fire*, better than *Water*, because it entreth better.

Experiment Solitary, touching the *Contrary Operations* of *Time*, upon *Fruits*, and *Liquours*. 861

Time doth change *Fruit*, (as *Apples*, *Peares*, *Pomegranats*, &c.) from more *Soure*, to more *Sweet*: But contrariwise *Liquours* (even those that are of the *Iuyce* of *Fruit*,) from more *Sweet* to more *Soure*; As *Wort*, *Must*, *New Verjuyce*, &c. The *Cause* is, the *Congregation* of the *Spirits* together: For in both Kindes, the *Spirit* is attenuated by *Time*; But in the first Kinde, it is more *Diffused*, and more mastered by the *Grosser Parts*; which the *Spirits* doe but disgest: But in *Drinkes* the *Spirits* doe reigne, and finding lesse Opposition of the *Parts*, become themselves more *Strong*; Which causeth also more Strength in the *Liquour*; Such, as if the *Spirits* be of the Hotter Sort, the *Liquour* becommeth apt to *Burne*; But in Time, it causeth likewise, when the Higher *Spirits* are Evapourated, more *Soureness*.

Experiment Solitary, touching *Blowes* and *Bruises*. 862

IT hath beene observed by the *Ancients*, that *Plates* of *Metall*, and especially of *Brasse*, applied presently to a *Blow*, will keepe it downe from *Swelling*. The *Cause* is *Repercussion*, without *Humectation*, or *Entrance* of any *Body*: for the *Plate* hath onely a *Virtuall Cold*, which doth not search into the *Hurt*; Whereas all *Plasters* and *Oyntments* doe enter. Surely, the *Cause*, that *Blowes* and *Bruises* induce *Swellings*, is, for that the *Spirits* resorting to Succour the *Part* that Laboureth, draw also the *Humours* with them: For wo see, that it is not the *Repulse*, and the *Returne* of the *Humour* in the *Part Strucken*, that causeth it; For that *Gouts*, and *Tooth-Aches* cause *Swelling*, where there is no *Percussion* at all.

Experiment Solitary, touching the *Orris Root*. 863

THe *Nature* of the *Orris Root*, is almost Singular; For there be few *Odoriferous Roots*; And in those that are, in any degree, *Sweet*, it is but the same *Sweetnesse* with the *Wood*, or *Leafe*: but the *Orris* is not *Sweet* in the *Leafe*; Neither is the *Flower* any thing so *Sweet* as the *Root*. The *Root* seemeth to have a Tender dainty *Heat*; which when it commeth above Ground, to the *Sunne*, and the *Aire*, vanisheth: For it is a great *Mollifier*; And hath a Smell like a *Violet*.

Experiment Solitary, touching the *Compression* of *Liquours*. 864

IT hath beene observed by the *Ancients*, that a great *Vessell* full, drawne into *Bottles*; And then the *Liquour* put againe into the *Vessell*, will not fill the *Vessell* again, so full as it was, but that it may take in more *Liquour*: And that this holdeth more in *Wine*, than in *Water*. The *Cause* may bee Triviall; Namely, by the *Expence* of the *Liquour*, in regard some may sticke to the Sides of the *Bottles*: But there may bee a *Cause* more Subtill; Which is, that the *Liquour* in the *Vessell*, is not so much *Compressed*, as in the *Bottle*; Because in the *Vessell*, the *Liquour* meeteth with *Liquour* chiefly; But in the *Bottles* a Small Quantity of *Liquour*, meeteth with the Sides of the *Bottles*, which Compresse it so, that it doth not Open againe.

Experiment Solitary, touching the *Working* of *Water* upon *Aire Contiguous*. 865

WAter, being contiguous with *Aire*, Cooleth it, but Moisteneth it not, except it *Vapour*. The *Cause* is, for that *Heat* and *Cold* have a *Virtuall Transition*, without *Communication* of *Substance*; but *Moisture* not: And to all *Madefaction* there is required an *Imbibition*: But where the *Bodies* are of such severall Levitie, and Gravity, as they Mingle not, they can follow

no

no *Imbibition*. And therefore, *Oyle* likewise lyeth at the *Top* of the *Water*, without Commixture: And a *Drop* of *Water*, running swiftly over a *Straw*, or *Smooth Body*, wetteth not.

Experiment Solitary, touching the *Nature* of *Aire*.

866 *Starre-Light Nights*, yea and bright *Moone-shine Nights*, are *Colder* than *Cloudy Nights*. The *Cause* is, the *Drinesse* and *Fineness* of the *Aire*, which thereby becommeth more *Piercing*, and *Sharpe*: And therefore *Great Continents* are colder than *Islands*: And as for the *Moone*, though it selfe inclineth the *Aire* to *Moisture*, yet when it shineth bright, it argueth the *Aire* is drie. Also *Close Aire* is warmer than *Open Aire*; which (it may bee) is, for that the true *Cause* of *Cold*, is an *Expiration* from the *Globe* of the *Earth*, which in open *Places* is stronger; And againe, *Aire* it selfe, if it be not altered by that *Expiration*, is not without some Secret *Degree* of *Heat*: As it is not likewise without some Secret *Degree* of *Light*: For otherwise *Cats*, and *Owles*, could not see in the *Night*; But that *Aire* hath a little *Light*, Proportionable to the *Visuall Spirits* of those *Creatures*.

Experiments in Consort, touching the *Eyes*, and *Sight*.

867 THe *Eyes* doe move one and the same way; For when one *Eye* moveth to the *Nosthrill*, the other moveth from the *Nosthrill*. The *Cause* is *Motion* of *Consent*, which in the *Spirits*, and *Parts Spirituall*, is Strong. But yet *Vse* will induce the Contrary: For some can *Squint*, when they will: And the Common *Tradition* is, that if *Children*, be set upon a Table, with a Candle behinde them, both *Eyes* will move Outwards; As affecting to see the *Light*, and so induce *Squinting*.

868 We see more exquisitely with *One Eye Shut*, than with *Both Open*. The *Cause* is, for that the *Spirits Visuall* unite themselves more, and so become Stronger. For you may see, by looking in a *Glasse*, that when you shut one *Eye*, the *Pupill* of the other *Eye*, that is Open, Dilateth.

869 The *Eyes*, if the *Sight* meet not in one *Angle*, *See Things Double*. The *Cause* is, for that *Seeing* two Things, and *Seeing* one Thing twice, worketh the same *Effect*: And therefore a little *Pellet*, held betweene two *Fingers*, laid a crosse, seemeth *Double*.

870 *Pore-Blinde Men*, see best in the *Dimmer Light*; And likewise have their *Sight* Stronger neere hand, than those that are not *Pore-blinde*; And can Reade and Write smaller *Letters*. The *Cause* is, for that the *Spirits Visuall*, in those that are *Pore-blinde*, are Thinner, and Rarer, than in others; And therefore the Greater *Light* disperseth them. For the same *Cause* they need Contracting; But being *Contracted*, are more strong, than the *Visuall Spirits* of Ordinary *Eyes* are; As when we see thorow a *Levell*, the *Sight* is the Stronger: And so is it, when you gather the *Eye-lids* somewhat close: And it is commonly seene in those that are *Pore-blinde*, that they doe much gather the *Eye-lids* together. But *Old Men*, when they would see to Read, put the Paper somewhat a farre off. The *Cause* is, for that *Old Mens Spirits Visuall*, contrary to those of *Pore-blinde Men*, unite not, but when the *Object* is at some good distance, from their *Eyes*.

871 *Men* see better, when their *Eyes* are over-against the *Sunne*, or a *Candle*, if they put their *Hand* a little before their *Eye*. The Reason is, for that the *Glaring* of the *Sunne*, or the *Candle*, doth weaken the *Eye*; whereas the *Light Circumfused* is enough for the *Perception*. For we see, that an *Over-light* maketh the *Eyes* Dazell; Insomuch as Perpetuall Looking against the *Sunne*, would Cause *Blindnesse*. Againe, if *Men* come out of a *Great Light*, into a *Darke Roome*; And contrariwise, if they come out of a *Darke Roome*, into a

Light

Light Roome, they seeme to have a *Mist* before their *Eyes*, and see worse than they shall doe, after they have stayed a little while, either in the *Light*, or in the *Darke*. The *Cause* is, for that the *Spirits Visuall*, are upon a sudden Change, disturbed, and put out of Order; And till they be recollected, doe not performe their Function well. For when they are much *Dilated* by *Light*, they cannot *Contract* suddenly; And when they are much *Contracted* by *Darknesse*, they cannot *Dilate* suddenly. And Excesse of both these, (that is, of the *Dilatation*, and *Contraction* of the *Spirits Visuall*,) if it be long, Destroyeth the *Eye*. For as long looking against the *Sunne*, or *Fire* hurteth the *Eye* by *Dilatation*; So *Curious Painting* in *Small Volumes*, and *Reading* of *Small Letters*, doe hurt the *Eye* by *Contraction*.

It hath beene observed, that in *Anger*, the *Eyes* wax *Red*; And in *Blushing*, not the *Eyes*, but the *Eares*, and the *Parts* behinde them. The *Cause* is, for that in *Anger*, the *Spirits* ascend and wax Eager; Which is most easily seen in the *Eyes*, because they are Translucide; Though withall it maketh both the *Cheekes* and the *Gills Red*; But in *Blushing*, it is true, the *Spirits* ascend likewise to Succour, both the *Eyes*, and the *Face*, which are the *Parts* that labour: But then they are repulsed by the *Eyes*, for that the *Eyes*, in Shame doe put back the *Spirits*, that ascend to them, as unwilling to looke abroad: For no *Man*, in that *Passion*, doth looke strongly, but Dejectedly; And that *Repulsion* from the *Eyes*, Diverteth the *Spirits* and *Heat* more to the *Eares*, and the *Parts* by them. 872

The *Objects* of the *Sight*, may cause a great *Pleasure* and *Delight* in the *Spirits*, but no *Paine*, or great *Offence*; Except it be by *Memory*, as hath been said. The *Glimpses* and *Beames* of *Diamonds* that strike the *Eye*; *Indian Feathers*, that have glorious Colours; The *Comming* into a *Faire Garden*; The *Comming* into a *Faire Roome* richly furnished; A *Beautifull* Person; And the like; doe delight and exhilarate the *Spirits* much. The *Reason*, why it holdeth not in the *Offence*, is, for that the *Sight* is most *Spirituall* of the *Senses*; whereby it hath no *Object* Grosse enough to offend it. But the *Cause* (chiefly) is, for that there bee no *Active Objects* to offend the *Eye*. For *Harmonicall Sounds*, and *Discordant Sounds*, are both *Active*, and *Positive*: So are *Sweet Smells*, and *Stinks*: So are *Bitter*, and *Sweet*, in *Tastes*: So are *Over-Hot*, and *Over-Cold*, in *Touch*: But *Blacknesse*, and *Darknesse*, are indeed but *Privatives*; And therefore have little or no *Activity*. Somewhat they doe Contristate, but very little. 873

Experiment Solitary, touching the *Colour* of the *Sea*, or other *Water*. 874

WAter of the *Sea*, or otherwise, looketh *Blacker* when it is moved, and *Whiter* when it resteth. The *Cause* is, for that by means of the *Motion*, the *Beames* of light passe not Straight, and therfore must be darkened; whereas, when it resteth, the *Beames* doe passe Straight. Besides, *Splendour* hath a *Degree* of *Whiteness*; Especially if there be a little *Repercussion*: For a *Looking-Glasse* with the *Steele* behinde, looketh *Whiter*, than *Glasse Simple*. This *Experiment* deserveth to be driven further, in Trying by what Meanes *Motion* may hinder *Sight*.

Experiment Solitary, touching *Shell-Fish*. 875

SHell-Fish have beene, by some of the *Ancients*, compared and sorted with the *Insecta*; But I see no reason why they should; For they have *Male*, and *Female*, as other *Fish* have: Neither are they bred of *Putrefaction*; Especially such as doe Move. Nevertheless it is certaine, that *Oysters*, and *Cockles*, and *Mussles*, which Move not, have not discriminate *Sex*. *Quære* in what time, and how they are bred? It seemeth that *Shells* of *Oysters* are bred where

none

none were before; And it is tried, that the great *Horse-Muſsle*, with the fine ſhell, that breedeth in *Ponds*, hath bred within thirty yeares: But then, which is ſtrange, it hath beene tried, that they doe not onely Gape and Shut, as the *Oiſters* doe, but Remove from one Place to Another.

Experiment Solitary, touching the *Right Side*, and the *Left*. 876

THe *Senſes* are alike Strong, both on the *Right Side*, and on the *Left*; But the *Limmes* on the *Right Side* are Stronger. The *Cauſe* may be, for that the *Braine* which is the *Inſtrument* of *Senſe*, is alike on both *Sides*; But *Motion*, and *Habilities* of *Moving*, are ſomewhat holpen from the *Liver*, which lieth on the *Right Side*. It may bee alſo, for that the *Senſes* are put in *Exerciſe*, indifferently, on both *Sides* from the Time of our Birth; But the *Limmes* are uſed moſt on the *Right Side*, whereby *Cuſtome* helpeth; For wee ſee, that ſome are *Left Handed*: Which are ſuch as have uſed the *Left-Hand* moſt.

Experiment Solitary, touching *Frictions*. 877

FRictions make the *Parts* more *Fleſhie*, and *Full*: As we ſee both in *Men*; And in the *Currying* of *Horſes*, &c. The *Cauſe* is, for that they draw greater *Quantitie* of *Spirits* and *Bloud* to the *Parts*: And again, becauſe they draw the *Aliment* more forcibly from within: And againe, becauſe they relax the *Pores*, and ſo make better *Paſſage* for the *Spirits*, *Bloud*, and *Aliment*: Laſtly, becauſe they diſſipate, and diſgeſt any *Inutile* or *Excrementitious Moiſture*, which lieth in the *Fleſh*: All which help *Aſſimulation*. *Frictions* alſo doe more *Fill*, and *Impinguate* the *Body*, than *Exerciſe*. The *Cauſe* is, for that in *Frictions*, the *Inward Parts* are at reſt; Which in *Exerciſe* are beaten (many times) too much: And for the ſame Reaſon, (as we have noted heretofore,) *Gally-Slaves* are *Fat* and *Fleſhie*, becauſe they ſtirre the *Limmes* more, and the *Inward Parts* leſſe.

Experiment Solitary, touching *Globes* appearing *Flat* at *Diſtance*. 878

ALL *Globes* a farre off appeare *Flat*. The *Cauſe* is, for that *Diſtance*, being a *Secundary Object of Sight*, is not otherwiſe diſcerned, than by more or leſſe *Light*; which *Diſparity* when it cannot bee diſcerned, all ſeemeth *One*: As it is (generally) in *Objects* not diſtinctly diſcerned; For ſo *Letters*, if they be ſo farre off, as they cannot be diſcerned, ſhew but as a *Duskiſh Paper*: And all *Engravings*, and *Emboſſings*, (a farre off) appear *Plaine*.

Experiment Solitary, touching *Shadowes*. 879

THe *Vttermoſt Parts* of *Shadowes* ſeeme ever to *Tremble*. The *Cauſe* is, for that the little *Moats*, which we ſee in the *Sunne*, doe ever Stirre, though there be no *Wind*; And therefore thoſe Moving, in the Meeting of the *Light* and the *Shadow*, from the *Light* to the *Shadow*, and from the *Shadow* to the *Light*, doe ſhew the *Shadow* to Move, becauſe the *Medium* Moveth.

Experiment Solitary, touching the *Rowling* and *Breaking* of the *Seas*. 880

SHallow, and *Narrow Seas*, breake more than *Deepe*, and *Large*. The *Cauſe* is, for that the *Impulſion* being the ſame in Both; Where there is greater *Quantity* of *Water*, and likewiſe *Space* Enough; there the *Water* Rowleth, and Moveth, both more Slowly, and with a Sloper Riſe, and Fall: But where there is leſſe *Water*, and leſſe *Space*, and the *Water* daſheth more againſt the bottome; there it moveth more Swiftly, and more in *Precipice*; For in the *Breaking* of the *Waves* there is ever a *Precipice*.

Experiment Solitary, touching the *Dulcoration* of *Salt-Water*. 881

IT hath beene obſerved by the *Ancients*, that *Salt-Water Boyled*, or *Boyled* and *Cooled* againe, is more *Potable*, than of it ſelfe *Raw*: And yet the *Taſte* of *Salt*, in *Diſtillations* by *Fire*, riſeth not; For the *Diſtilled Water* will bee

Freſh.

Fresh. The *Cause* may be, for that the *Salt Part* of the *Water*, doth partly rise into a *Kinde* of *Scumme* on the *Top*; And partly goeth into a *Sediment* in the *Bottome*: And so is rather a *Separation*, than an *Evaporation*. But it is too grosse to rise into a *Vapour*: And so is a *Bitter Taste* likewise; For Simple *Distilled Waters*, of *Wormewood*, and the like, are not Bitter.

Experiment Solitary, touching the *Returne* of *Saltnesse* in *Pits* upon the *Sea-Shore* 882

IT hath beene set downe before, that *Pits* upon the *Sea-Shoare*, turne into *Fresh Water*, by *Percolation* of the *Salt* through the *Sand*: But it is further noted, by some of the *Ancients*, that in some Places of *Affricke*, after a time, the *Water* in such *Pits* will become *Brackish* againe. The *Cause* is, for that after a time, the very *Sands*, thorow which the *Salt-Water* passeth, become *Salt*; And so the *Strainer* it selfe is tincted with *Salt*. The Remedie therefore is, to digge still *New Pits*, when the old wax *Brackish*; as if you would change your *Strainer*.

Experiment Solitary, touching *Attraction* by *Similitude* of *Substance*. 883

IT hath beene observed by the *Ancients*, that *Salt-Water*, will dissolve *Salt* put into it, in lesse time, than *Fresh Water* will dissolve it. The *Cause* may be, for that the *Salt* in the *Precedent Water*, doth, by *Similitude* of *Substance*, draw the *Salt* new put in, unto it; Whereby it diffuseth in the *Liquour* more speedily. This is a Noble *Experiment*, if it be true; For it sheweth Meanes of more Quicke and Easie *Infusions*; And it is likewise a good *Instance* of *Attraction*, by *Similitude* of *Substance*. Trie it with *Sugar* put into *Water*, formerly *Sugred*; And into other *Water Vnsugred*.

Experiment Solitary, touching *Attraction*. 884

PUt *Sugar* into *Wine*, part of it above, part under the *Wine*; And you shall finde, (that which may seeme strange,) that the *Sugar* above the *Wine*, will soften and dissolve sooner, than that within the *Wine*. The *Cause* is, for that the *Wine* entreth that *Part* of the *Sugar*, which is under the *Wine*, by Simple *Infusion*, or *Spreading*; But that *Part* above the *Wine*, is likewise forced by *Sucking*: For all *Spungie Bodies* expell the *Aire*, and draw in *Liquour*, if it be Contiguous: As we see it also in *Spunges*, put part above the *Water*. It is worthy the Inquiry, to see how you may make more *Accurate Infusions*, by Help of *Attraction*.

Experiment Solitary, touching *Heat* under *Earth*. 885

WAter in *Wells* is *warmer* in *Winter*, than in *Summer*: And so *Aire* in *Caves*. The *Cause* is, for that in the Higher *Parts*, under the *Earth*, there is a *Degree* of some *Heat*; (As appeareth in *Sulphureous Veines*, &c.) Which shut close in, (as in *Winter*,) is the More; But if it Perspire, (as it doth in *Summer*,) it is the lesse.

Experiment Solitary, touching *Flying* in the *Aire*. 886

IT is reported, that amongst the *Leucadians*, in *Ancient* time, upon a Superstition they did use to Precipitate a *Man*, from a *High Cliffe* into the *Sea*; Tying about him, with Strings, at some distance, many great *Fowles*; And fixing unto his *Body* divers *Feathers*, spred, to breake the *Fall*. Certainly many *Birds* of good *Wing*, (As *Kites*, and the like,) would beare up a good *Weight*, as they flie; And *Spreading* of *Feathers* thinne, and close, and in great Breadth, will likewise beare up a great *Weight*; Being even laid, without Tilting upon the Sides. The further *Extension* of this *Experiment* for *Flying* may be thought upon.

Experiment Solitary, touching the *Dye* of *Scarlet*. 887

THere is, in some Places, (namely in *Cephalonia*,) a little *Shrub*, which they call *Holy-Oake*, or *Dwarf-Oake*: Upon the *Leaves* whereof there riseth

seth a *Tumour*, like a *Blister*; Which they gather, and rub out of it, a certaine *Red Dust*, that converteth (after a while) into *Wormes*, which they kill with *Wine*, (as is reported,) when they begin to Quicken: With this *Dust* they die *Scarlet*.

Experiment Solitary, touching *Maleficiating*. 888

IN *Zant*, it is very ordinary, to make *Men Impotent*, to accompany with their *Wives*. The like is Practised in *Gasconie*; Where it is called *Noverl'eguillette*. It is practised alwayes upon the *Wedding Day*. And in *Zant*, the Mothers themselves doe it, by way of Prevention; Because thereby they hinder other *Charmes*, and can undoe their Owne. It is a Thing the *Civill Law* taketh knowledge of; And therefore is of no Light Regard.

Experiment Solitary, touching the *Rise* of *Water* by *Meanes* of *Flame*. 889

IT is a Common *Experiment*, but the *Cause* is mistaken. Take a *Pot*, (Or better a *Glasse*, because therein you may see the *Motion*,) And set a *Candle* lighted in the *Bottome* of a *Bason* of *Water*; And turne the *Mouth* of the *Pot*, or *Glasse*, over the *Candle*, and it will make the *Water* rise. They ascribe it to the *Drawing* of *Heat*; Which is not true: For it appeareth plainly to bee but a *Motion* of *Nexe*, which they call *Ne detur vacuum*; And it proceedeth thus. The *Flame* of the *Candle*, as soone as it is covered, being suffocated by the *Close Aire*, lesseneth by little and little: During which time, there is some little Ascent of *Water*, but not much: For the *Flame* Occupying lesse and lesse Roome, as it lesseneth, the *Water* succeedeth. But upon the *Instant* of the *Candles Going out*, there is a sudden *Rise*, of a great deale of *Water*; For that the *Body* of the *Flame* filleth no more Place; And so the *Aire*, and the *Water* succeed. It worketh the same *Effect*, if in stead of *Water*, you put *Flower*, or *Sand*, into the *Bason*: Which sheweth, that it is not the *Flames* Drawing the *Liquour*, as *Nourishment*; As it is supposed; For all *Bodies* are alike unto it; As it is ever in *Motion* of *Nexe*; Insomuch as I have seen the *Glasse*, being held by the Hand, hath lifted up the *Bason*, and all: The *Motition* of *Nexe* did so Clasp the *Bottome* of the *Bason*. That *Experiment*, when the *Bason* was lifted up, was made with *Oyle*, and not with *Water*: Nevertheless this is true, that at the very first *Setting* of the *Mouth* of the *Glasse*, upon the *Bottome* of the *Bason*, it draweth up the *Water* a little, and then standeth at a Stay, almost till the *Candles Going out*, as was said. This may shew some *Attraction* at first: But of this we will speake more, when we handle *Attractions* by *Heat*.

Experiments in Consort, touching the *Influences* of the *Moone*.

Of the *Power* of the *Celestiall Bodies*, and what more Secret *Influences* they have, besides the two Manifest *Influences* of *Heat*, and *Light*, Wee shall speake, when wee handle *Experiments* touching the *Celestiall Bodies*: Meane-while, wee will give some Directions for more certaine *Trialls*, of the *Vertue* and *Influences* of the *Moone*; which is our *Nearest Neighbour*.

The *Influences* of the *Moone*, (most observed,) are Foure, The *Drawing forth* of *Heat*: The *Inducing* of *Putrefaction*: the *Increase* of *Moisture*: The *Exciting* of the *Motions* of *Spirits*.

For

For the *Drawing forth* of *Heat*, we have formerly prescribed to take *Water Warme*, and to set Part of it against the *Moone Beames*, and Part of it with a *Skreene* betweene; And to see whether that which standeth Exposed to the *Beames*, will not *Coole* sooner. But because this is but a Small *Interposition*, (though in the *Sunne* we see a Small *Shade* doth much,) it were good to trie it, when the *Moone* shineth, and when the *Moone* shineth not at all; And with *Water Warme* in a *Glasse-Bottle*, as well as in a *Dish*; And with *Cinders*; And with *Iron Red-Hot*; &c. 890

For the *Inducing* of *Putrefaction*, it were good to trie it with *Flesh*, or *Fish*, Exposed to the *Moone-Beames*; And againe Exposed to the *Aire*, when the *Moone* shineth not, for the like time; To see whether will corrupt sooner: And trie it also with *Capon*, or some other *Fowle*, laid abroad, to see whether it will mortifie, and become tender sooner? Trie it also with Dead *Flies*, or Dead *Wormes*, having a little *Water* cast upon them, to see whether will *Putrefie* sooner. Trie it also with an *Apple*, or *Orenge*, having *Holes* made in their *Tops*, to see whether will Rot or Mould sooner? Trie it also with *Holland Cheese*, having *Wine* put into it, whether will breed *Mites* sooner or greater? 891

For the *Increase* of *Moisture*, the Opinion Received is; That *Seeds* will grow sooneſt; And *Haire*, and *Nailes*, and *Hedges*, and *Herbs*, Cut, &c. will grow sooneſt, if they be Set, or Cut, in the *Increase* of the *Moone*. Also that *Braines* in *Rabits*, *Wood-Cocks*, *Calves*, &c. are fullest in the *Full* of the *Moone*: And so of *Marrow* in the *Bones*; And so of *Oysters*, and *Cockles*, which of all the rest are the easiest tried, if you have them in *Pits*. 892

Take some *Seeds*, or *Roots*, (as *Onions*, &c.) And set some of them immediately after the *Change*; And others of the same kinde immediately after the *Full*: Let them be as Like as can be: The *Earth* also the Same as neare as may be; And therefore best in *Pots*: Let the *Pots* also stand, where no *Raine*, or *Sunne* may come to them, lest the *Difference* of the *Weather* confound the *Experiment*: And then see in what Time, the *Seeds Set* in the *Increase* of the *Moone*, come to a certaine Height; And how they differ from those that are *Set* in the *Decrease* of the *Moone*. 893

It is like, that the *Braine* of *Man* waxeth *Moister*, and *Fuller*, upon the *Full* of the *Moone*: And therefore it were good for those that have *Moist Braines*, and are great *Drinkers*, to take *Fume* of *Lignum Aloës*, *Rose-Mary*, *Frankincense*, &c. about the *Full* of the *Moone*. It is like also, that the *Humours* in *Mens Bodies*, Increase, and Decrease, as the *Moone* doth; And therefore it were good to Purge, some day, or two, after the *Full*; For that then the *Humours* will not replenish so soone againe. 894

As for the *Exciting* of the *Motion* of the *Spirits*, you must note that the *Growth* of *Hedges*, *Herbs*, *Haire*, &c. is caused from the *Moone*, by *Exciting* of the *Spirits*, as well as by *Increase* of the *Moisture*. But for *Spirits* in particular, the great *Instance* is in *Lunacies*. 895

There may be other Secret *Effects* of the *Influence* of the *Moone*, which are not yet brought into *Observation*. It may be, that if it so fall out, that the *Wind* be *North*, or *North-East*, in the *Full* of the *Moone*, it increaseth *Cold*; And if *South*, or *South-West*, it disposeth the *Aire*, for a good while, to *Warmth*, and *Raine*; Which would be observed. 896

It may be, that *Children*, and *Young Cattell*, that are *Brought forth* in the *Full* of the *Moone*, are stronger, and larger, than those that are brought forth in the *Wane*: And those also which are *Begotten* in the *Full* of the *Moone*: So that it might be good *Husbandrie*, to put *Rammes*, and *Bulls* to their *Females*, 897

Females, somewhat before the *Full* of the *Moone*. It may bee also, that the *Egges* lay'd in the *Full* of the *Moone*, breed the better *Bird*: And a Number of the like *Effects*, which may bee brought into *Observation*: *Quære* also, whether great *Thunders*, and *Earth-Quakes*, be not most in the *Full* of the *Moone*.

Experiment Solitary, touching *Vinegar* 898

THe *Turning* of *Wine* to *Vinegar*, is a Kind of *Putrefaction*: And in *Making* of *Vinegar*, they use to set *Vessels* of *Wine* over against the *Noone-Sunne*; which calleth out the more *Oylie Spirits*, and leaveth the *Liquour* more *Soure*, and *Hard*. We see also, that *Burnt-Wine* is more *Hard*, and *Astringent*, than *Wine Vnburnt*. It is said that *Cider* in *Navigations* under the *Line* ripeneth, when *VVine* or *Beere* sowreth. It were good to set a *Rundlet* of *Verjuyce* over against the *Sunne*, in *Summer*, as they doe *Vinegar*, to see whether it will Ripen, and Sweeten.

Experiment Solitary, touching *Creatures* that *Sleep* all *Winter*. 899

THere be divers *Creatures*, that *Sleepe* all *VVinter*; As the *Beare*, the *Hedge-hog*, the *Bat*, the *Bee*, &c. These all wax *Fat* when they *Sleepe*, and egest not. The *Cause* of their *Fattening*, during their *Sleeping time*, may be the *VVant* of *Assimilating*; For whatsoever *Assimilateth* not to *Flesh*, turneth either to *Sweat*, or *Fat*. These *Creatures*, for part of their *Sleeping-Time*, have beene observed not to *Stirre* at all; And for the other part, to *Stirre*, but not to *Remove*. And they get *VVarme* and *Close Places* to *Sleep* in. When the *Flemmings* Wintred in *Nova Zembla*, the *Beares*, about the Middle of *November*, went to *Sleepe*, And then the *Foxes* began to come forth, which durst not before. It is noted by some of the *Ancients*, that the *Shee-Beare* breedeth, and lyeth in with her Young, during that time of *Rest*: And that a *Beare*, *Big* with *Young*, hath seldome beene seene.

Experiment Solitary, touching the *Generation* of *Creatures* by *Copulating*, and by *Putrefaction*. 900

SOme *Living Creatures* are Procreated by *Copulation* betweene *Male*, and *Female*: Some by *Putrefaction*; And of those which come by *Putrefaction*, many doe (nevertheless) afterwards procreate by *Copulation*. For the *Cause* of both *Generations*: First, it is most certaine, that the *Cause* of all *Vivification*, is a *Gentle* and *Proportionable Heat*, working upon a *Glutinous* and *Yeelding Substance*: For the *Heat* doth bring forth *Spirit* in that *Substance*: And the *Substance*, being *Glutinous*, produceth Two *Effects*: The One, that the *Spirit* is *Detained*, and cannot *Breake forth*: The Other, that the *Matter* being *Gentle*, and *Yeelding*, is driven forwards by the *Motion* of the *Spirits*, after some *Swelling* into *Shape*, and *Members*. Therefore all *Sperme*, all *Menstruous Substance*, all *Matter* whereof *Creatures* are produced by *Putrefaction*, have evermore a *Closenesse*, *Lentour*, and *Sequacitie*. It seemeth therefore, that the *Generation* by *Sperme onely*, and by *Putrefaction*, have two Different *Causes*. The first is, for that *Creatures*, which have a *Definite* and *Exact Shape*, (as those have which are Procreated by *Copulation*,) cannot be produced by a *VVeake*, and *Casuall Heat*; Nor out of *Matter*, which is not *Exactly Prepared*, according to the *Species*. The Second is, for that there is a greater *Time* required, for *Maturation* of *Perfect Creatures*; For if the *Time* required in *Vivification* bee of any length, then the *Spirit* will Exhale, before the *Creature* be *Mature*: Except it bee inclosed in a *Place* where it may have *Continuance* of the *Heat*, *Accesse* of some *Nourishment* to maintaine it, and *Closenesse* that may keepe it from *Exhaling*. And such

Places

Places, or the *VVombs*, and *Matrices*, of the *Females*. And therefore all *Creatures*, made of *Putrefaction*, are of more *Vncertaine Shape*; And are made in *Shorter Time*; And need not so Perfect an *Enclosure*, though some *Closenesse* be commonly required. As for the *Heathen Opinion*, which was, that upon great *Mutations* of the *VVorld*, *Perfect Creatures* were first Engendred of *Concretion*; As well as *Frogs*, and *VVormes*, and *Flies*, and such like, are now; Wee know it to bee vaine: But if any such Thing should bee admitted, Discoursing according to *Sense*, it cannot be, except you admit of a *Chaos* first, and *Commixture* of *Heaven* and *Earth*. For the *Frame* of the *VVorld* once in Order, cannot effect it by any *Excesse*, or *Casualty*.

NATU-

NATVRALL HISTORIE.

X. Century.

Experiments in Consort, touching the *Transmission*, and *Influx*, of *Immateriate Vertues*, and the *Force* of *Imagination*.

THe *Philosophie* of *Pythagoras*, (which was full of *Superstition*,) did first plant a *Monstrous Imagination*, which afterwards was, by the *Schoole* of *Plato*, and Others, Watred, and Nourished. It was, That the *World* was *One*, *Entire*, *Perfect*, *Living Creature*; Insomuch as *Apollonius* of *Tyana*, a *Pythagorean Prophet*, affirmed, that the *Ebbing* and *Flowing* of the *Sea*, was the *Respiration* of the *World*, drawing in *Water* as *Breath*, and putting it forth againe. They went on, and inferred; That if the *World* were a *Living Creature*, it had a *Soule*, and *Spirit*; Which also they held, calling it *Spiritus Mundi*; The *Spirit* or *Soule* of the *World*: By which they did not intend *God*; (for they did admit of a *Deity* besides:) But onely the *Soule*, or *Essentiall Forme* of the *Vniverse*. This *Foundation* being laid, they mought build upon it, what they would; For in a *Living Creature*, though never so great, (As for Example, in a great *Whale*,) the *Sense*, and the *Affects* of any one *Part* of the *Body*, instantly make a *Transcursion* thorowout the whole *Body*: So that by this they did insinuate, that no distance of *Place*, nor *Want* or *Indisposition* of *Matter*, could hinder *Magicall Operations*; But that (for Example,) we mought here in *Europe*, have *Sense* and *Feeling* of that, which was done in

in *China:* And likewise, we mought worke any *Effect*, *without* and *against Matter:* And this, not Holpen by the *Cooperation* of *Angels*, or *Spirits*, but onely by the *Vnitie* and *Harmony* of *Nature*. There were some also, that staid not here; but went further, and held; That if the *Spirit* of *Man*, (whom they call the *Microcosme*,) doe give a fit touch to the *Spirit* of the *World*, by strong *Imaginations*, and *Beleefes*, it might command *Nature*; For *Paracelsus* and some darksome *Authors*, of *Magicke*, doe ascribe to *Imagination Exalted*, the *Power* of *Miracle-working Faith*. With these Vast and Bottomelesse *Follies*, *Men* have beene (in part) entertained.

But wee, that hold firme to the *Works* of *God*; And to the *Sense*, which is *Gods Lamp*; (*Lucerna Dei Spiraculum Hominis*;) will enquire, with all Sobrietie, and Severity, whether there be to be found, in the Foot-steps of *Nature*, any such *Transmission* and *Influx* of *Immateriate Vertues*; And what the *Force* of *Imagination* is; Either upon the *Body Imaginant*, or upon another *Body*: Wherein it will be like that *Labour* of *Hercules*, in Purging the *Stable* of *Augeas*, to separate from *Superstitious*, and *Magicall Arts*, and *Observations*, any thing that is cleane, and pure *Naturall*; And not to be either Contemned, or Condemned. And although we shall have occasion to speake of this in more Places than One, yet we will now make some Entrance thereinto.

Experiments in Consort, *Monitorie*, touching *Transmission* of *Spirits*, and the *Force* of *Imagination*.

901 *Men* are to be Admonished, that they doe not with-draw Credit, from the *Operations* by *Transmission* of *Spirits*, and *Force* of *Imagination*, because the *Effects faile sometimes*. For as in *Infection*, and *Contagion* from *Body* to *Body*, (as the *Plague*, and the like,) it is most certaine, that the *Infection* is received (many times) by the *Body Passive*, but yet is by the *Strength*, and good *Disposition* thereof, Repulsed, and wrought out, before it be formed in a *Disease*; So much more in *Impressions* from *Minde* to *Minde*, or from *Spirit* to *Spirit*, the *Impression* taketh, but is Encountred, and Overcome, by the *Minde* and *Spirit*, which is *Passive*, before it worke any manifest *Effect*. And therefore they worke most upon *Weake Mindes*, and *Spirits:* As those of *Women*; *Sicke Persons*; *Superstitious* and *Fearfull Persons*; *Children*, and *Young Creatures:*

Nescio quis teneros Oculus mihi fascinat Agnos:

The *Poet* speaketh not of *Sheep*, but of *Lambs*. As for the *Weakneſſe* of the *Power* of them, upon *Kings*, and *Magistrates*; It may bee ascribed (besides the main, which is the *Protection* of *God*, over those that Execute his Place,) to the *Weakneſſe* of the *Imagination* of the *Imaginant:* For it is hard for a *Witch*, or a *Sorcerer*, to put on a Beliefe, that they can hurt such *Persons*.

902 *Men* are to be Admonished, on the other side, that they doe not easily give Place and Credit to these *Operations*, because they *Succeed many times*;

For

For the *Cause* of this *Successe*, is (oft) to be truely ascribed, unto the *Force* of *Affection* and *Imagination*, upon the *Body Agent*; And then by a *Secondary Meanes*, it may worke upon a *Divers Body*: As for Example; If a *Man* carry a *Planets Seale*, or a *Ring*, or some *Part* of a *Beast*, beleeving strongly, that it will help him to obtaine his *Love*; Or to keep him from danger of hurt in *Fight*; or to prevaile in a *Suit*; &c. it may make him more *Active*, and *Industrious*; And againe, more *Confident*, and *Persisting*, than otherwise he would be. Now the great *Effects* that may come of *Industrie*, and *Perseverance*, (especially in *Civill Businesse*,) who knoweth not? For wee see *Audacity* doth almost binde and mate the *weaker Sort* of *Mindes*; And the *State* of *Humane Actions* is so variable, that to trie Things oft, and never to give over, doth Wonders: Therefore it were a Meere *Fallacie* and *Mistaking*, to ascribe that to the *Force* of *Imagination*, upon another *Body*, which is but the *Force* of *Imagination* upon the Proper *Body*: For there is no doubt, but that *Imagination*, and *Vehement Affection*, worke greatly upon the *Body* of the *Imaginant*: As we shall shew in due place.

Men are to be Admonished, that as they are not to mistake the *Causes* of these *Operations*; So, much lesse, they are to mistake the *Fact*, or *Effect*; And rashly to take that for done, which is not done. And therefore, as divers wise *Iudges* have prescribed, and cautioned, *Men* may not too rashly beleeve, the *Confessions* of *Witches*, nor yet the *Evidence* against them. For the *Witches* themselves are *Imaginative*, and beleeve oft-times, they doe that, which they doe not: And *People* are *Credulous* in that point, and ready to impute *Accidents*, and *Naturall Operations*, to *Witch-Craft*. It is worthy the Observing, that both in *Ancient*, and *Late times*; (As in the *Thessalian Witches*, and the Meetings of *Witches* that have beene recorded by so many late *Confessions*,) the great *Wonders* which they tell, of *Carrying* in the *Aire*; *Transforming* themselves into other *Bodies*; &c. are still reported to bee wrought, not by *Incantations* or *Ceremonies*; But by *Ointments*, and *Annointing* themselves all over: This may justly move a *Man* to thinke, that these *Fables* are the *Effects* of *Imagination*: For it is certaine, that *Ointments* doe all, (if they be laid on any thing thicke,) by *Stopping* of the *Pores*, shut in the *Vapours*, and send them to the *Head* extremely. And for the Particular *Ingredients* of those *Magicall Ointments*, it is like they are *Opiate*, and *Soporiferous*. For *Annointing* of the *Fore-head*, *Necke*, *Feet*, *Back-Bone*, wee know is used for Procuring *Dead Sleeps*: And if any *Man* say, that this *Effect* would bee better done by Inward *Potions*; Answer may bee made, that the *Medicines*, which goe to the *Ointments*, are so strong, that if they were used inwards, they would kill those that use them: And therefore they work Potently, though Outwards. 903

We will divide the Severall Kindes of the *Operations*, by *Transmission* of *Spirits*, and *Imagination*; Which will give no small Light to the *Experiments* that follow. All *Operations* by *Transmission* of *Spirits*, and *Imagination* have this; That they *Work* at *Distance*, and not at *Touch*; And they are these being distinguished.

The First is the *Transmission* or *Emission*, of the *Thinner*, and more *Airy Parts* of *Bodies*; As in *Odours*, and *Infections*; And this is, of all the rest, the most *Corporeall*. But you must remember withall, that there be a Number of those *Emissions*, both *Wholesome*, and *Vnwholesome*, that give no *Smell* at all: 904

For

For the *Plague*, many times when it is taken, giveth no *Sent* at all: And there be many *Good* and *Healthfull Aires*, that doe appeare by *Habitation*, and other Proofes, that differ not in *Smell* from other *Aires*. And under this Head, you may place all *Imbibitions* of *Aire*, where the *Substance* is *Materiall*, *Odour-like*; Whereof some nevertheleſſe are ſtrange, and very ſuddenly diſſuſed; As the *Alteration* which the *Aire* receiveth in *Ægypt*, almoſt immediately, upon the *Riſing* of the *River* of *Nilus*, whereof we have ſpoken.

905 The Second is the *Tranſmiſſion* or *Emiſſion* of thoſe *Things* that wee call *Spirituall Species*; As *Viſibles*, and *Sounds*: The one whereof wee have handled; And the other wee ſhall handle in due place. Theſe move ſwiftly, and at great diſtance; But then they require a *Medium* well diſpoſed; And their *Tranſmiſſion* is eaſily ſtopped.

906 The Third is the *Emiſſions*, which cauſe *Attraction* of *Certaine Bodies* at *Diſtance*; Wherein though the *Loadſtone* be commonly placed in the Firſt Ranke, yet we thinke good to except it, and referre it to another *Head*: but the *Drawing* of *Amber*, and *Iet*, and other *Electricke Bodies*; And the *Attraction* in *Gold* of the *Spirit* of *Quick-Silver*, at diſtance; And the *Attraction* of *Heat* at diſtance; And that of *Fire* to *Naphtha*; And that of ſome *Herbs* to *VVater*, though at diſtance; And divers others; Wee ſhall handle, but yet not under this preſent *Title*, but under the *Title* of *Attraction* in generall.

907 The Fourth is the *Emiſſion* of *Spirits*, and *Immateriate Powers* and *Vertues*, in thoſe Things, which worke by the *Vniverſall Configuration*, and *Sympathy* of the *VVorld*; Not by *Formes*, or *Celeſtiall Influxes*, (as is vainly taught and received,) but by the *Primitive Nature* of *Matter*, and the *Seeds* of *Things*. Of this kinde is, (as we yet ſuppoſe,) the *VVorking* of the *Load-Stone*, which is by *Conſent* with the *Globe* of the *Earth*: Of this kinde is the *Motion* of *Gravitie*, which is by *Conſent* of *Denſe Bodies*, with the *Globe* of the *Earth*: Of this kinde is ſome *Diſpoſition* of *Bodies* to *Rotation*, and particularly from *Eaſt* to *VVeſt*: Of which kinde we conceive the *Maine Float* and *Refloat* of the *Sea* is, which is by *Conſent* of the *Vniverſe*, as Part of the *Diurnall Motion*. Theſe *Immateriate Vertues* have this Propertie differing from others; That the *Diverſity* of the *Medium* hindereth them not; But they paſſe through all *Mediums*; yet at *Determinate Diſtances*. And of theſe wee ſhall ſpeake, as they are incident to ſeverall *Titles*.

908 The Fifth is the *Emiſſions* of *Spirits*; And this is the Principall in our Intention to handle now in this Place: Namely, the *Operation* of the *Spirits* of the *Minde* of *Man*, upon other *Spirits*: And this is of a *Double Nature*: The *Operations* of the *Affections*, if they be Vehement; And the *Operation* of the *Imagination*, if it be Strong. But theſe two are ſo *Coupled*, as we ſhall handle them together; For when an *Envious*, or *Amorous Aſpect*, doth infect the *Spirits* of Another, there is Joyned both *Affection*, and *Imagination*.

909 The Sixth is, the Influxes of the *Heavenly Bodies*, beſides thoſe two Manifeſt Ones, of *Heat*, and *Light*. But theſe we will handle, where we handle the *Celeſtiall Bodies*, and *Motions*.

910 The Seventh is the *Operations* of *Sympathy*; Which the *Writers* of *Naturall Magicke* have brought into an *Art*, or *Precept*: And it is this; That if you deſire to Super-induce, any *Vertue* or *Diſpoſition*, upon a *Perſon*, you ſhould take the *Living Creature*, in which that *Vertue* is moſt *Eminent*, and in *Perfection*: Of that *Creature* you muſt take the *Parts*, wherein that *Vertue* chiefly is *Collocate*: Againe, you muſt take thoſe *Parts*, in the *Time*, and *Act*, when that *Vertue* is moſt in *Exerciſe*; And then you muſt apply it to that

Part

Part of *Man*, wherein that *Vertue* chiefly *Consisteth*. As if you would Superinduce *Courage* and *Fortitude*, take a *Lion*, or a *Cocke*; And take the *Heart*, *Tooth*, or *Paw* of the *Lion*; Or the *Heart*, or *Spurre* of the *Cocke*: Take those *Parts* immediately after the *Lion*, or the *Cocke* have beene in *Fight*; And let them be worne, upon a *Mans-Heart*, or *Wrest*. Of these and such like *Sympathies*, we shall speake under this present *Title*.

The Eighth and last is, an *Emission* of *Immateriate Vertues*; Such as wee are a little doubtfull to Propound; It is so prodigious: But that it is so constantly avouched by many: And we have set it downe, as a Law to our Selves, to examine things to the Bottome; And not to receive upon Credit, or reject upon Improbabilities, untill there hath passed a due Examination. This is, the *Sympathy* of *Individuals*: For as there is a *Sympathy* of *Species*; So, (it may be) there is a *Sympathy* of *Individuals*: That is, that in *Things*, or the *Parts* of *Things* that have beene once *Contiguous*, or *Entire*, there should remain a *Transmission* of *Vertue* from the One to the Other: As betweene the *Weapon*, and the *Wound*. Whereupon is blazed abroad the *Operation* of *Vnguentum Teli*: And so of a *Peece* of *Lard*, or *Sticke* of *Elder*, &c. that if *Part* of it be Consumed or Putrified, it will worke upon the other *Part Severed*. Now we will pursue the *Instances* themselves. 911

THe *Plague* is many times taken without *Manifest Sense*, as hath beene said. And they report, that where it is found, it hath a Sent, of the *Smell* of a *Mellow Apple*; And (as some say) of *May Flowers*: And it is also received, that *Smels* of *Flowers* that are *Mellow* and *Lushious*, are ill for the *Plague*; As *White-Lillies*, *Cowslips*, and *Hyacinths*. Experiments in Consort touching *Emission* of *Spirits* in *Vapour*, or *Exhalation*, *Odour-like*.

The *Plague* is not easily received by such, as continually are about them, that have the *Plague*; As *Keepers* of the *Sicke*, and *Physitians*; Nor againe by such as take *Antidotes*, either Inward, (as *Mithridate*; *Iuniper-Berries*; *Rue*, *Leafe*, and *Seed*; &c.) Or Outward, (as *Angelica*, *Zedoary*, and the like, in the Mouth; *Tarre*, *Galbanum*, and the like, in Perfume;) Nor againe by *Old People*, and such as are of a *Drie* and *Cold Complexion*. On the other side, the *Plague* taketh soonest hold of those, that come out of a *Fresh Aire*; And of those that are *Fasting*; And of *Children*; And it is likewise noted to goe in a *Bloud*, more than to a *Stranger*. 912 913

The most Pernicious *Infection*, next the *Plague*, is the *Smell* of the *Iayle*, When *Prisoners* have beene Long, and Close, and Nastily kept; Whereof we have had, in our time, Experience, twice or thrice; when both the *Iudges* that sate upon the *Iayle*, and *Numbers* of those that attended the Businesse, or were present, *Sickned* upon it, and *died*. Therefore it were good wisdome, that in such Cases, the *Iayle* were Aired, before they be brought forth. 914

Out of question, if such *Foule Smells* bee made by *Art*, and by the Hand, they consist chiefly of *Mans Flesh*, or *Sweat*, *Putrified*; For they are not those *Stinks*, which the *Nosthrils* straight abhorre, and expell, that are most *Pernicious*; But such *Aires*, as have some similitude with *Mans Body*; And so insinuate themselves, and betray the *Spirits*. There may bee great danger, in using such Compositions, in great Meetings of People, within Houses; As in *Churches*; At *Arraignments*; At *Playes* and *Solemnities*; And the like; For *Poysoning* of *Aire* is no lesse dangerous than *Poysoning* of *Water*; Which hath been used by the *Turks* in the Warres; And was used by *Emanuel Comnenus* towards the *Christians*, when they passed thorow his *Countrey* to the *Holy Land*. And these *Empoysonments* of *Aire*, are the more dangerous in *Meetings* of *People*; Because the much *Breath* of *People*, doth further the *Reception* of 915

the

the *Infection*: And therefore, where any such thing is feared, it were good, those *Publique Places* were perfumed, before the *Assemblies*.

916 The *Empoysonment* of Particular *Persons*, by *Odours*, hath beene reported to be in *Perfumed Gloves*, or the like: And it is like, they Mingle the *Poyson* that is deadly, with some *Smells* that are Sweet, which also maketh it the sooner received. *Plagues* also have been raised by *Annointings* of the *Chincks* of *Doores*, and the like; Not so much by the Touch, as for that it is common for *Men*, when they finde any thing Wet upon their Fingers, to put them to their *Nose*; Which Men therefore should take heed how they doe. The best is, that these *Compositions* of *Infectious Aires*, cannot be made without *Danger* of *Death*, to them that make them. But then againe, they may have some *Antidotes* to save themselves; So that *Men* ought not to be secure of it.

917 There have beene, in divers *Countries*, great *Plagues*, by the *Putrefaction*, of great *Swarmes* of *Grasse-Hoppers*, and *Locusts*, when they have beene dead, and cast upon Heaps.

918 It happeneth oft in *Mines*, that there are *Damps*, which kill, either by *Suffocation*, or by the *Poysonous Nature* of the *Minerall*: And those that deale much in *Refining*, or other Workes about *Metals*, and *Mineralls*, have their *Braines* Hurt and Stupefied by the *Metalline Vapours*. Amongst which, it is noted, that the *Spirits* of *Quick-Silver*, ever flie to the *Skull*, *Teeth*, or *Bones*; Insomuch as *Gilders* use to have a Peece of *Gold* in their *Mouth*, to draw the *Spirits* of the *Quick-Silver*; Which *Gold* afterwards they finde to be Whitened. There are also certaine *Lakes*, and *Pits*, such as that of *Avernus*, that *Poyson Birds*, (as is said,) which fly over them; Or *Men*, that stay too long about them.

919 The *Vapour* of *Char-Coale*, or *Sea-Coale*, in a Close Roome, hath killed many: And it is the more dangerous, because it commeth without any *Ill Smell*; But stealeth on by little and little; Enducing onely a *Faintnesse*, without any *Manifest Strangling*. When the *Dutch-Men* Wintred at *Nova Zembla*, and that they could gather no more Sticks, they fell to make Fire of some *Sea-Coale* they had, wherewith (at first) they were much refreshed; But a little after they had sit about the *Fire*, there grew a Generall Silence, and lothnesse to speake amongst them; And immediately after, One of the *Weakest* of the *Company*, fell down in a Swoune; Whereupon they doubting what it was, opened their doore, to let in *Aire*, and so saved themselves. The *Effect* (no doubt) is wrought by the *Insissation* of the *Aire*; And so of the *Breath*, and *Spirits*. The like ensueth in *Roomes* newly *Plaistered*, if a *Fire* bee made in them; Whereof no lesse *Man* than the *Emperour Iovinianus* Died.

920 *Vide* the *Experiment*, 803. touching the *Infectious Nature* of the *Aire*, upon the First *Showers*, after long *Drought*.

921 It hath come to passe, that some *Apothecaries*, upon *Stamping* of *Coloquintida*, have beene put into a great *Skouring*, by the *Vapour* onely.

922 It hath beene a Practice, to burne a *Pepper*, they call *Ginny-Pepper*; Which hath such a strong *Spirit*, that it provoketh a *Continuall Sneezing*, in those that are in the *Roome*.

923 It is an *Ancient Tradition*, that *Bleare-Eyes* infect *Sound Eyes*; And that a *Menstruous Woman*, looking upon a *Glasse*, doth rust it. Nay they have an *Opinion*, which seemeth *Fabulous*; That *Menstruous Women*, going over a *Field*, or *Garden*, doe *Corne* and *Herbs* good by *Killing* the *Wormes*.

924 The *Tradition* is no lesse *Ancient*, that the *Basiliske* killeth by *Aspect*; And that

that the *Wolfe*, if he see a *Man* first, by *Aspect* striketh a *Man* hoarse.

Perfumes Convenient doe drie and strengthen the *Brain*; And stay *Rheumes*, and *Defluxions*; As we finde in *Fume* of *Rose-Mary* dried, and *Lignum Aloës*, and *Calamus* taken at the *Mouth*, and *Nosthrils*; And no doubt there be other *Perfumes*, that doe moisten, and refresh; And are fit to be used in *Burning Agues*, *Consumptions*, and too much *Wakefulnesse*; Such as are, *Rose-Water*, *Vinegar*, *Limon-Pills*, *Violets*, the *Leaves* of *Vines* sprinkled with a little *Rose-Water*, &c. 925

They doe use in *Sudden Faintings*, and *Swounings*, to put a *Handkerchiefe* with *Rose-Water*, or a *Little Vinegar*, to the *Nose*; Which gathereth together againe the *Spirits*, which are upon point to resolve, and fall away. 926

Tobacco comforteth the *Spirits*, and dischargeth *Wearinesse*; Which it worketh, partly by Opening; But chiefly by the *Opiate Vertue*, which condenseth the *Spirits*. It were good therefore to trie the *Taking* of *Fumes* by *Pipes*, (as they doe in *Tobacco*,) of other *Things*; As well to drie, and comfort, as for other *Intentions*. I wish Triall bee made of the *Drying Fume*, of *Rose-Mary*, and *Lignum-Aloës*, before mentioned, in *Pipe*; And so of *Nutmeg*, and *Folium Indum*; &c. 927

The *Following* of the *Plough*, hath beene approved, for *Refreshing* the *Spirits*, and *Procuring Appetite*: But to doe it in the *Ploughing* for *VVheat*, or *Rye*, is not so good; Because the *Earth* hath spent her Sweet *Breath*, in *Vegetables*, put forth in *Summer*. It is better therefore to doe it when you sow *Barley*. But because Ploughing is tied to *Seasons*, it is best to take the *Aire* of the *Earth*, new turned up, by *Digging* with the *Spade*; Or *Standing* by him that *Diggeth*. *Gentlewomen* may doe themselves much good by kneeling upon a Cushion, and *VVeeding*. And these Things you may practise in the best *Seasons*; Which is ever the *Early Spring*, before the *Earth* putteth forth the *Vegetables*; And in the *Sweetest Earth* you can chuse. It would be done also, when the *Dew* is a little off the *Ground*, lest the *Vapour* bee too Moist. I knew a great *Man*, that lived Long, who had a Clean *Clod* of *Earth*, brought to him every *Morning*, as hee sate in his *Bed*; And he would hold his *Head* over it, a good pretty while. I commend also, sometimes, in *Digging* of *New Earth*, to poure in some *Malmesey*, or *Greeke Wine*; That the *Vapour* of the *Earth*, and *VVine* together, may comfort the *Spirits*, the more; Provided alwayes, it be not taken, for a *Heathen Sacrifice*, or *Libation* to the *Earth*. 928

They have, in *Physicke*, Use of *Pomanders*, and *Knots* of *Powders*, for *Drying* of *Rheumes*, *Comforting* of the *Heart*, *Provoking* of *Sleepe*, &c. For though those things be not so strong as *Perfumes*, yet you may have them continually in your *Hand*; whereas *Perfumes* you can take but at *Times*; And besides, there be divers *Things*, that breath better of themselves, than when they come to the *Fire*; As *Nigella Romana*; the *Seed* of *Melanthium*; *Amomum*; &c. 929

There be two *Things*, which (inwardly used) doe Coole and condense the *Spirits*; And I wish the same to be tried outwardly in *Vapours*. The One is *Nitre*, which I would have dissolved in *Malmesey*, or *Greeke-VVine*, and so the *Smell* of the *VVine* taken; Or if you would have it more forcible, poure of it upon a *Fire-pan*, well heated, as they doe *Rose-water* and *Vinegar*. The Other is the *Distilled VVater* of *VVilde Poppey*; which I wish to bee mingled, at halfe, with *Rose-VVater*, and so taken with some *Mixture* of a few *Cloves*, in a *Perfuming-Pan*. The like would be done with the *Distilled VVater* of *Saffron Flowers*. 930

Smells

931 *Smells* of *Muske*, and *Amber*, and *Civit*, are thought to further *Venereous Appetite*: Which they may doe by the *Refreshing* and *calling forth* of the *Spirits*.

932 *Incense*, and *Nidorous Smells*, (such as were of *Sacrifices*,) were thought to Intoxicate the *Braine*, and to dispose *Men* to *Devotion*: Which they may doe by a kinde of *Sadnesse*, and *Contristation* of the *Spirits*: And partly also by *Heating*, and *Exalting* them. We see, that amongst the *Iewes*, the *Principall Perfume* of the *Sanctuary*, was forbidden all *Common Vses*.

933 There be some *Perfumes*, prescribed by the *Writers* of *Naturall Magicke*, which procure *Pleasant Dreames*; And some others, (as they say,) that procure *Prophetical Dreames*; As the *Seeds* of *Flax*, *Flea-Wort*, &c.

934 It is certaine, that *Odours* doe, in a small Degree, Nourish; Especially the *Odour* of *Wine*: And wee see *Men* an hungred, doe love to smell *Hot Bread*. It is related, that *Democritus*, when he lay a dying, heard a *Woman*, in the House, complaine, that shee should bee kept from being at a *Feast*, and *Solemnity*, (which she much desired to see,) because there would be a *Corps* in the House; Whereupon he caused *Loaves* of *New Bread* to bee sent for, and opened them; And powred a little *Wine* into them; And so kept himselfe alive with the *Odour* of them, till the *Feast* was past. I knew a *Gentleman*, that would fast (sometimes) three or foure, yea five dayes, without *Meat*, *Bread*, or *Drinke*; But the same *Man* used to have continually, a great *Wisp* of *Herbs*, that hee smelled on: And amongst those *Herbs*, some *Esculent Herbs* of strong *Sent*; As *Onions*, *Garlick*, *Leekes*, and the like.

935 They doe use, for the *Accident* of the *Mother*, to burne *Feathers*, and other *Things* of *Ill Odour*: And by those *Ill Smells*, the *Rising* of the *Mother* is put downe.

936 There be *Aires*, which the *Physitians* advise their *Patients* to remove unto, in *Consumptions*, or upon *Recovery* of *Long Sicknesses*: Which (commonly are *Plaine Champaignes*, but *Grasing*, and not Over-growne with *Heath*, or the like: Or else *Timber-Shades*, as in *Forrests*, and the like. It is noted also, that *Groves* of *Bayes* doe forbid *Pestilent Aires*; Which was accounted a great *Cause* of the Wholesome *Aire* of *Antiochia*. There be also some *Soyles* that put forth *Odorate Herbs* of themselves; As *Wilde Thyme*; *Wilde Marjoram*; *Penny-Royall*; *Camomill*; And in which the *Briar-Roses* smell almost like *Muske-Roses*; Which (no doubt) are *Signes* that doe discover an *Excellent Aire*.

937 It were good for *Men*, to thinke of having *Healthfull Aire*, in their *Houses*; Which will never be, if the *Roomes* be *Low-Roofed*, or full of *Windowes*, and *Doores*; For the one maketh the *Aire Close*, and not *Fresh*; And the other maketh it Exceeding *Vnequall*; Which is a great Enemy to *Health*. The *Windowes* also should not be high up to the *Roofe*, (which is in use for Beautie, and Magnificence,) but Low. Also *Stone-VValls* are not wholesome; But *Timber* is more wholesome; And especially *Brick*, Nay it hath beene used by some, with great Successe, to make their *VValls* thick; And to put a Lay of *Chalke* betweene the *Bricks*, to take away all *Dampishnesse*.

Experiment Solitary, touching the *Emissions* of *Spirituall Species* which *Affect* the *Senses*.

938 THese *Emissions* (as we said before,) are handled, and ought to be handled, by themselves, under their *Proper Titles*: That is, *Visibles*, and *Audibles*, each a-part: In this Place, it shall suffice to give some generall *Observations*, Common to both. First, they seeme to bee *Incorporeall*. Secondly, they Worke *Swifily*. Thirdly, they Worke at *Large Distances*. Fourthly, in *Curious Varieties*. Fiftly, they are not *Effective* of any *Thing*; Nor leave no

Worke behinde them; But are *Energies* meerely; For their *Working* upon *Mirrours*, and *Places* of *Eccho*, doth not alter any Thing in those *Bodies*; But it is the same *Action* with the *Originall*, onely *Repercussed*. And as for the *Shaking* of *Windowes*, or *Rarifying* the *Aire* by *Great Noises*; And the *Heat* caused by *Burning-Glasses*; They are rather *Concomitants* of the *Audible*, and *Visible Species*, than the *Effects* of them. Sixthly, they seeme to be of so *Tender*, and *Weake* a *Nature*, as they affect onely such a Rare, and Attenuate *Substance*, as is the *Spirit* of *Living Creatures*.

Experiments in Consort, touching the *Emission* or *Immateriate Vertues* from the *Mindes*, and *Spirits* of *Men*, either by *Affections*, or by *Imaginations*, or by other *Impressions*.

IT is mentioned in some *Stories*, that where *Children* have beene *Exposed*, or taken away young from their *Parents*; And that afterward they have approached to their *Parents* presence, the *Parents*, (though they have not knowne them,) have had a *Secret Ioy*, or Other *Alteration* thereupon. 939

There was an *Ægyptian South-Sayer*, that made *Anthonius* beleeve, that his *Genius*, (which otherwise was *Brave*, and *Confident*,) was, in the Presence of *Octavianus Cæsar*, *Poore*, and *Cowardly*: And therefore, he advised him, to absent himselfe, (as much as he could,) and remove farre from him. The *South-Sayer* was thought to be suborned by *Cleopatra*, to make him live in *Ægypt*, and other Remote *Places* from *Rome*. How soever the Conceit of a *Predominant* or *Mastering Spirit* of one *Man* over Another, is Ancient, and Received still, even in *Vulgar Opinion*. 940

There are Conceits, that some *Men*, that are of an *Ill*, and *Melancholy Nature*, doe incline the *Company*, into which they come, to be *Sad*, and *Ill disposed*; And contrariwise, that Others, that are of a *Ioviall Nature*, doe dispose the *Company to be Merry* and *Cheerfull*. And againe, that some *Men* are *Luckie* to bee *kept Company* with, and *Employed*; And others *Vnluckie*. Certainly, it is agreeable to *Reason*, that there are, at the least, some *Light Effluxions* from *Spirit* to *Spirit*, when *Men* are in *Presence* one with another, as well as from *Body* to *Body*. 941

It hath beene observed, that *Old Men*, who have loved *Young Company*, and beene Conversant continually with them, have beene of *Long Life*; Their *Spirits*, (as it seemeth,) being Recreated by such *Company*. Such were the *Ancient Sophists*, and *Rhetoricians*; Which ever had *Young Auditours*, and *Disciples*; As *Gorgias*, *Protagoras*, *Isocrates*, &c. Who lived till they were an Hundred yeares Old. And so likewise did many of the *Grammarians*, and *Schoole-Masters*; such as was *Orbilius*, &c. 942

Audacitie and *Confidence* doth, in Civill Businesse, so great Effects, as a *Man* may (reasonably) doubt, that besides the very *Daring*, and *Earnestnesse*, and *Persisting*, and *Importunitie*, there should be some *Secret Binding*, and *Stooping* of other *Mens Spirits*, to such *Persons*. 943

The *Affections* (no doubt) doe make the *Spirits* more *Powerfull*, and *Active*; And especially those *Affections*, which draw the *Spirits* into the *Eyes*: Which are two: *Love*, and *Envy*, which is called *Oculus Malus*. As for *Love*, the *Platonists*, (some of them,) goe so farre, as to hold that the *Spirit* of the *Lover*, doth passe into the *Spirits* of the *Person Loved*; Which causeth the desire of Returne into the *Body*, whence it was *Emitted*: Whereupon followeth that *Appetite* of *Contract*, and *Conjunction*, which is in *Lovers*. And this is observed likewise, that the *Aspects* that procure *Love*, are not *Gazings*, but *Sudden Glances*, and *Dartings* of the *Eye*. As for *Envy*, that emitteth some *Maligne* and *Poysonous Spirits*, which taketh hold of the *Spirit* of Another; And is likewise of greatest Force, when the *Cast* of the *Eye* is *Oblique*. It hath beene noted also, that it is most Dangerous, when an 944

Envious Eye is cast upon *Persons* in *Glory*, and *Triumph*, and *Ioy*. The *Reason* whereof is, for that, at such times, the *Spirits* come forth most, into the *Outward Parts*, and so meet the *Percussion* of the *Envious Eye*, more at *Hand*: And therefore it hath beene noted, that after great *Triumphs*, *Men* have been ill disposed, for some Dayes following. We see the Opinion of *Fascination* is Ancient; for both *Effects*; Of Procuring *Love*; And *Sicknesse* caused by *Envie*: And *Fascination* is ever by the *Eye*. But yet if there be any such *Infection* from *Spirit* to *Spirit*, there is no doubt, but that it worketh by *Presence*, and not by the *Eye* alone; Yet most Forcibly by the *Eye*.

945 *Feare*, and *Shame*, are likewise *Infective*; For we see that the *Starting* of one will make another ready to *Start*: And when one *Man* is out of *Countenance* in a *Company*, others doe likewise *Blush* in his behalfe.

Now we will speake of the *Force* of *Imagination* upon other *Bodies*; and of the *Meanes* to *Exalt* and *Strengthen* it. *Imagination*, in this Place, I understand to bee, the *Representation* of an *Individuall Thought*. *Imagination* is of three Kindes: The First *Joyned* with *Beleefe* of that which is to *Come*: The Second *Ioyned* with *Memorie* of that which is *Past*; And the Third is of *Things Present*, or as if they were *Present*; For I comprehend in this, *Imagination Faigned*, and at *Pleasure*; As if one should *Imagine* such a *Man* to bee in the *Vestments* of a *Pope*; Or to have *Wings*. I single out, for this time, that which is with *Faith*, or *Beleefe* of that which is to *Come*. The *Inquisition* of this *Subject*, in our way, (which is by *Induction*,) is wonderfull hard; For the *Things* that are reported, are full of *Fables*; And *New Experiments* can hardly bee made, but with Extreme Caution; For the Reason which wee will after declare.

The *Power* of *Imagination* is in three Kindes; The First, upon the *Body* of the *Imaginant*; Including likewise the *Child* in the *Mothers Womb*; The Second is, the *Power* of it upon *Dead Bodies*, as *Plants*, *Wood*, *Stone*, *Metall*, &c. The Third is, the *Power* of it, upon the *Spirits* of *Men*, and *Living Creatures*; And with this last we will onely meddle.

The *Probleme* therefore is, whether a *Man Constantly* and *Strongly Beleeving*, that such a *Thing* shall be; (As that such an *One* will *Love Him*; Or that such an *One* will *Grant Him* his *Request*; Or that such an *One* shall *Recover* a *Sicknesse*; Or the like;) It doth help any thing to the *Effecting* of the *Thing* it selfe. And here againe we must warily distinguish; For it is not meant, (as hath beene partly said before,) that it should help by *Making* a *Man More Stout*, or more *Industrious*; (in which kinde a *Constant Beleefe* doth much;) But meerely by a *Secret Operation*,

ration, or *Binding*, or *Changing* the *Spirit* of *Another*: And in this it is hard (as wee began to say,) to make any *New Experiment*; For I cannot *command* my Selfe to *Beleeve* what I will, and so no *Triall* can be made. Nay it is worse; For whatsoever a *Man Imagineth doubtingly*, or with *Feare*, must needs doe hurt; if *Imagination* have any *Power* at all; For a *Man* representeth that oftner, that he feareth, than the contrary.

The Helpe therefore is, for a *Man* to worke by *Another*, in whom he may Create *Beleefe*, and not by *Himselfe*; untill *Himselfe* have found by *Experience*, that *Imagination* doth prevaile; For then *Experience* worketh in *Himselfe Beleefe*; if the *Beleefe*, that such a *Thing* shall be, be joyned with a *Beleefe*, that his *Imagination* may procure it.

For Example, I related one time to a *Man*, that was Curious, and Vaine enough in these Things; *That I saw a kinde of* Jugler, *that had a* Paire *of* Cards, *and would tell a* Man *what* Card *he thought*. This Pretended Learned Man told mee; It was a Mistaking in Mee; *For (said he) it was not the* Knowledge *of the* Mans Thought, *(for that is Proper to* God,) *but it was the* Inforcing *of a* Thought *upon him, and* Binding *his* Imagination *by a* Stronger, *that hee could* Think no other *Card*. And thereupon he asked me a *Question*, or two, which I thought, he did but cunningly, knowing before what used to be the *Feats* of the *Iugler*. *Sir, (said hee,) doe you remember whether he told the* Card, *the* Man *thought*, Himselfe, *or bade* Another *to tell it*. I answered (as was true;) *That he bade Another tell it*. Whereunto he said; *So I thought: For (said he) Himselfe could not have put on so strong an* Imagination; *But by telling the other the* Card, *(who beleeved that the* Jugler *was some Strange* Man, *& could doe Strange* Things,) *that other* Man *caught a strong* Imagination. I hearkened unto him, thinking for a Vanity he spoke prettily. Then he asked mee another *Question*: Saith he; *Doe you remember, whether he bad the* Man *think the* Card *first, and afterwards told the other* Man *in his Eare, what he should thinke; Or else that hee did whisper first in the* Mans *Eare, that should tell the* Card, *telling that such a* Man *should thinke such a* Card, *and after bade the* Man *thinke a* Card? I told him, as was true; *That he did first whisper the* Man *in the Eare, that such a* Man *should thinke such a* Card: upon this the *Learned Man* did much Exult, and Please himselfe, saying; *Loe, you may see that my* Opinion *is right: For if the* Man *had thought first, his* Thought *had beene fixed: But the other* Imagining *first, bound his* Thought. Which though it did somewhat sinke with mee, yet I made it Lighter than I thought, and said; *I thought it was* Confederacy, *betweene the* Juggler, *and the two* Servants: Though (indeed) I had no Reason so to thinke: For they were both my *Fathers* Servants; And hee had never plaid in the House before. The *Iuggler* also did cause a *Garter* to bee held up; And tooke upon him, to know, that such an *One*, should point in such a *Place*, of the *Garter*; As it should be neare so many *Inches* to the *Longer End*, and so many to the *Shorter*; And still hee did it, by *First Telling* the *Imaginer*, and after *Bidding* the *Actour Thinke*. 946

Having told this *Relation*, not for the Weight thereof, but because it doth handsomely open the *Nature* of the *Question*; I

returne to that I said; That *Experiments* of *Imagination*, must be practised by Others, and not by a *Mans* Selfe. For there bee Three *Meanes* to fortifie *Beleefe*: The First is *Experience*: The Second is *Reason*: And the Third is *Authoritie*: And that of these, which is farre the most *Potent*, is *Authoritie*: For *Beleefe* upon *Reason*, or *Experience*, will Stagger.

947 For *Authority*, it is of two Kinds; *Beleefe* in an *Art*; And *Beleefe* in a *Man*. And for Things of *Beleefe* in an *Art*; A *Man* may exercise them by *Himselfe*; But for *Beleefe* in a *Man*, it must be by *Another*. Therefore, if a *Man* beleeve in *Astrologie*, and finde a *Figure* Prosperous; Or beleeve in *Naturall Magick*, and that a *Ring* with such a *Stone*, or such a *Peece* of a *Living Creature*, Carried, will doe good; It may help his *Imagination*: But the *Beleefe* in a *Man* is farre the more *Active*. But howsoever, all *Authority* must bee out of a *Mans Selfe*, turned (as was said,) either upon an *Art*, or upon a *Man*: And where *Authority* is from one *Man* to another, there the Second must bee *Ignorant*, and not *Learned*, or *Full* of *Thoughts*; And such are (for the most part,) all *Witches*, and *Superstitious Persons*; Whose *Beleefes*, tied to their *Teachers*, and *Traditions*, are no whit controlled, either by *Reason*, or *Experience*: And upon the same Reason, in *Magicke*, they use (for the most part,) *Boyes*, and *Young People*; whose *Spirits* easilieſt take *Beleefe*, and *Imagination*.

Now to fortifie *Imagination*, there be three wayes: The *Authoritie* whence the *Beleefe* is derived; *Meanes* to *Quicken* and *Corroborate* the *Imagination*; And *Meanes* to *Repeat* it, and *Refresh* it.

948 For the *Authoritie*, we have already spoken: As for the Second; Namely the *Meanes* to *Quicken* and *Corroborate* the *Imagination*; We see what hath been used in *Magick*; (If there be in those Practises any thing that is purely *Naturall*;) As *Vestments*; *Characters*; *Words*; *Seales*; Some parts of *Plants*, or *Living Creatures*; *Stones*; *Choice* of the *Houre*; *Gestures* and *Motions*; Also *Incenses*, and *Odours*; *Choice* of *Societie*, which increaseth *Imagination*; *Diets* and *Preparations* for some time before. And for *Words*, there have beene ever used, either *Barbarous Words*, of no Sense, lest they should disturb the *Imagination*; Or *Words* of *Similitude*, that may second and feed the *Imagination*: And this was ever as well in *Heathen Charmes*, as in *Charmes* of latter Times. There are used also *Scripture-Words*; For that the *Beleefe*, that *Religious Texts*, and *Words* have Power, may strengthen the *Imagination*. And for the same Reason, *Hebrew Words*, (which amongst us is counted the *Holy Tongue*, and the *Words* more *Mystical*,) are often used.

949 For the *Refreshing* of the *Imagination*, (which was the Third *Meanes* of *Exalting* it;) We see the Practices of *Magicke*, as in *Images* of *Wax*, and the like, that should Melt by little, and little; Or some other *Things Buried* in *Mucke*, that should Putrifie by little and little; Or the like: For so oft as the *Imaginant* doth thinke of those Things, so oft doth hee represent to his *Imagination*, the *Effect* of that he desireth.

950 If there be any *Power* in *Imagination*, it is lesse credible, that it should bee so *Incorporeall* and *Immateriate* a *Vertue*, as to worke at great *Distances*; Or through all *Mediums*; Or upon all *Bodies*: But that the *Distance* must be competent; The *Medium* not Adverse; And the *Body* Apt and Proportionate. Therefore if there bee any Operation upon *Bodies*, in Absence by Nature;

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it is like to bee conveyed from *Man* to *Man*, as *Fame* is; As if a *Witch*, by *Imagination*, should hurt any a farre off, it cannot bee naturally, but by Working upon the *Spirit* of some, that commeth to the *Witch*; And from that *Party* upon the *Imagination* of *Another*; And so upon *Another*; till it come to one that hath resort to the *Partie Intended*; And so by *Him* to the *Partie intended himself*. And although they speake, that it sufficeth, to take a *Point*, or a *Peece* of the *Garment*, or the *Name* of the *Partie*, or the like; yet there is lesse Credit to be given to those Things, except it be by *Working* of evill *Spirits*.

The *Experiments*, which may certainly demonstrate the *Power* of *Imagination*, upon other *Bodies*, are few, or none: For the *Experiments* of *VVitchcraft*, are no cleare Proofes; For that they may bee, by a Tacite *Operation* of *Maligne Spirits*: Wee shall therefore be forced in this *Enquirie*, to resort to New *Experiments*: Wherein we can give onely *Directions* of *Trialls*, and not any *Positive Experiments*. And if any *Man* thinke, that we ought to have stayed, till wee had made *Experiment*, of some of them, our selves, (as we doe commonly in other *Titles*,) the Truth is, that these *Effects* of *Imagination* upon other *Bodies*, have so little Credit with us, as wee shall trie them at leisure: But in the meane Time, we will lead others the vvay.

When you worke by the *Imagination* of *Another*, it is necessary, that He, by whom you worke, have a *Precedent Opinion* of you, that you can doe Strange Things; Or that you are a *Man* of *Art*, as they call it; For else the Simple *Affirmation* to Another, that this or that shall bee, can worke but a weake *Impression*, in his *Imagination*. 951

It were good, because you cannot discerne fully of the *Strength* of *Imagination*, in one *Man* more than another, that you did use the *Imagination* of more than *One*; That so you may light upon a *Strong One*. As if a *Physitian* should tell Three, or Foure, of his *Patients Servants*, that their *Master* shall surely recover. 952

The *Imagination* of *One*, that you shall use, (such is the Varietie of *Mens Mindes*,) cannot be alwayes alike *Constant*, and *Strong*; And if the Successe follow not speedily, it will faint and leese *Strength*. To remedy this, you must pretend to Him, whose *Imagination* you use, severall *Degrees* of *Means*, by which to *Operate*; As to prescribe him, that every Three Dayes, if hee finde not the Successe Apparent, he doe use another *Root*, or *Part* of a *Beast*, or *Ring*, &c. As being of more *Force*; And if that faile, Another; And if that, Another; till Seven Times. Also you must prescribe a good Large Time for the *Effect* you promise; As if you should tell a *Servant* of a *Sick-Man*, that his *Master* shall recover, but it will bee Fourteene dayes, ere he findeth it apparently, &c. All this to entertaine the *Imagination*, that it waver lesse. 953

It is certaine, that *Potions*, or *Things* taken into the *Body*: *Incenses* and *Perfumes* taken at the *Nosthrils*; And *Oyntments* of some *Parts*; doe (naturally) worke upon the *Imagination* of Him that taketh them. And therefore it must needs greatly *Cooperate* with the *Imagination* of him, whom you use, if you prescribe him, before he doe use the *Receit*, for the *Worke* which he desireth, that he doe take such a *Pill*, or a *Spoonfull* of *Liquour*; Or burne such an *Incense*; Or *Annoint* his *Temples*, or the *Soles* of his *Feet*, with such an *Oint-* 954

ment, or *Oyle*: And you must chuse, for the *Composition* of such *Pill*, *Perfume*, or *Oyntment*, such *Ingredients*, as doe make the *Spirits*, a little more *Grosse*, or *Muddy*; Whereby the *Imagination* will fix the better.

955 The *Body Passive*, and to be *Wrought Vpon*, (I meane not of the *Imaginant*,) is better wrought upon, (as hath beene partly touched) at some *Times*, than at others: as if you should prescribe a *Servant*, about a *Sicke Person*, (whom you have possessed, that his *Master* shall recover,) when his *Master* is fast asleepe, to use such a *Root*, or such a *Root*. For *Imagination* is like to worke better upon *Sleeping Men*, than *Men Awake*; As wee shall shew when wee handle *Dreames*.

956 We finde in the *Art* of *Memory*, that *Images Visible*, worke better than other *Conceits*: As if you would remember the Word *Philosophy*, you shall more surely doe it, by *Imagining*, that such a *Man*, (For *Men* are best *Places*,) is reading upon *Aristotles Physicks*; Than if you should Imagine him to say; *I'le goe study Philosophy*. And therefore, this *Observation* would bee translated to the *Subject* we now speak of: For the more Lustrous the *Imagination* is, it filleth and fixeth the better. And therefore I conceive, that you shall, in that *Experiment*, (whereof we spake before,) of *Binding* of *Thoughts*, lesse faile, if you tell One, that such an *One* shall name one of *Twenty Men*, than if it were *One* of *Twenty Cards*. The *Experiment* of *Binding* of *Thoughts*, would be Diversified, and tried to the Full: And you are to note, whether it hit for the most part, though not alwayes.

957 It is good to consider, upon what *Things*, *Imagination* hath most Force: And the *Rule*, (as I conceive,) is, that it hath most *Force* upon *Things*, that have the *Lightest*, and *Easiest* Motions. And therefore above all, upon the *Spirits* of Men: And in them, upon such *Affections*, as move *Lightest*; As upon *Procuring* of *Love*; *Binding* of *Lust*, which is ever with *Imagination*, upon Men in *Feare*; Or Men in *Irresolution*; And the like. What soever is of this kinde would be thorowly enquired. *Trialls* likewise would bee made upon *Plants*, and that diligently: As if you should tell a Man, that such a *Tree* would Dye this yeare; And will him at these and these times, to goe unto it, to see how it thriveth. As for *Inanimate Things*, it is true, that the Motions of *Shuffling* of *Cards*, or *Casting* of *Dice*, are very *Light* Motions: And there is a *Folly* very usuall, that *Gamesters* imagine, that some that stand by them, bring them ill Luck. There would be Triall also made, of holding a *Ring* by a *Threed* in a *Glasse*, and telling him that holdeth it, before, that it shall strike so many times against the *Side* of the *Glasse*, and no more; Or of Holding a *Key* betweene two Mens *Fingers*, without a *Charme*; And to tell those that hold it, that at such *Name*, it shall goe off their *Fingers*: For these two are Extreme *Light* Motions. And howsoever I have no opinion of these things, yet so much I conceive to be true; That *Strong Imagination* hath more Force upon *Things Living*, Or that have beene *Living*, than *Things* meerely *Inanimate*: And more Force likewise upon *Light*, and *Subtill* Motions, than upon Motions *Vehement*, or Ponderous.

958 It is an usuall *Observation*, that if the *Body* of One *Murthered*, be brought before the *Murtherer*, the *Wounds* will bleed a-fresh. Some doe affirme, that the *Dead Body*, upon the Presence of the *Murtherer*, hath opened the *Eyes*; And that there have beene such like Motions, as well where the *Partie Murthered* hath beene *Strangled*, or *Drowned*, as where they have beene *Killed* by *Wounds*. It may be, that this participateth of a *Miracle*, by *Gods* Just Judgement, who usually bringeth *Murders* to Light: But if it be *Naturall*, it must be referred to *Imagination*.

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The *Tying* of the *Point* upon the day of *Marriage*, to make *Men* Impotent towards their *Wives*, which (as wee have formerly touched,) is so frequent in *Zant*, and *Gascony*, if it be *Naturall*, must be referred to the *Imagination* of *Him* that *Tieth* the *Point*. I conceive it to have the lesse Affinitie with *Witchcraft*, because not Peculiar Persons onely, (such as *Witches* are,) but any *Body* may doe it. 959

Experiments in Consort, touching the *Secret Vertue* of *Sympathy*, and *Antipathy*

THere be many *Things*, that worke upon the *Spirits* of *Man*, by *Secret Sympathy*, and *Antipathy*: The *Vertues* of *Precious Stones*, worne, have beene anciently and generally Received; And curiously assigned to worke severall *Effects*. So much is true; That *Stones* have in them fine *Spirits*; As appeareth by their *Splendour*: And therefore they may worke by *Consent* upon the *Spirits* of *Men*, to Comfort, and Exhilarate them. Those that are the best, for that *Effect*, are the *Diamond*, the *Emerald*, the *Iacinth Orientall*, and the *Gold-Stone*, which is the *Yellow Topaze*. As for their particular *Proprieties*, there is no Credit to be given to them. But it is manifest, that *Light*, above all things, excelleth in *Comforting* the *Spirits* of *Men*: And it is very probable, that *Light Varied* doth the same *Effect*, with more *Novelty*. And this is one of the *Causes*, why *Precious Stones* comfort. And therefore it were good to have *Tincted Lanthornes*, or *Tincted Skreenes*, of *Glasse Coloured* into *Greene*, *Blew*, *Carnation*, *Crimson*, *Purple*, &c. And to use them with *Candles* in the *Night*. So likewise to have Round *Glasses*, not onely of *Glasse Coloured thorow*, but with *Colours* laid betweene *Crystals*, with *Handles* to hold in ones Hand. *Prismes* are also Comfortable Things. They have of *Paris-Worke*, *Looking-Glasses*, bordered with broad *Borders* of small *Crystall*, and great Counterfeit *Precious Stones*, of all *Colours*, that are most Glorious and Pleasant to behold; Especially in the *Night*. The *Pictures* of *Indian Feathers*, are likewise Comfortable, and Pleasant to behold. So also Faire and Cleare *Pooles* doe greatly comfort the *Eyes*, and *Spirits*; Especially when the *Sunne* is not *Glaring*, but *Overcast*; Or when the *Moone* shineth. 960

There be divers Sorts of *Bracelets* fit to *Comfort* the *Spirits*; And they be of Three *Intentions*: *Refrigerant*; *Corroborant*; and *Aperient*. For *Refrigerant*, I wish them to be of *Pearle*, or of *Corall*, as is used: And it hath beene noted that *Corall*, if the *Party* that weareth it be ill disposed, will wax *Pale*: Which I beleeve to be true, because otherwise distemper of *Heat* will make *Corall* lose Colour. I Commend also *Beads*, or little *Plates* of *Lapis Lazuli*; And *Beads* of *Nitre*, either alone, or with some *Cordiall* Mixture. 961

For *Corroboration* & *Confortation*, take such *Bodies* as are of *Astringent Quality*, without *Manifest Cold*. I commend *Bead-Amber*, which is full of *Attrition*, but yet is *Vnctuous*, and not *Cold*; And is conceived to *Impinguate* those that weare such *Beads*: I commend also *Beads* of *Harts-Horne*, and *Ivory*, which are of the like Nature; Also *Orenge-Beads*; Also *Beads* of *Lignum Aloës*, *Macerated* first in *Rose-Water*, and *Dryed*. 962

For *Opening*, I Commend *Beads*, or *Peeces* of the *Roots* of *Carduus Benedictus*: Also of the *Roots* of *Piony* the *Male*; And of *Orris*; And of *Calamus Aromaticus*; And of *Rem*. 963

The Cramp, (no doubt) commeth of *Contraction* of *Sinewes*; Which is Manifest, in that it commeth either by *Cold*, or *Drinesse*; As after *Consumptions*, and *Long Agues*; For *Cold* and *Drinesse* doe (both of them) *Contract*, and *Corrugate*. Wee see also, that *Chafing* a little above the *Place* in paine, easeth the *Cramp*; Which is wrought by the *Dilatation*, of the *Contracted Sinewes*, by *Heat*. There are in use, for the Prevention of the *Cramp*, two Things; 964

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The one *Rings* of *Sea-Horse Teeth*, worne upon the *Fingers*; The other *Bands* of *Greene Perewinckle*,(the Herb,)tied about the *Calfe* of the *Leg*, or the *Thigh*,&c.where the *Cramp* useth to come.I doe finde this the more strange, because Neither of these have any *Relaxing Vertue*, but rather the Contrary. I judge therefore, that their *Working* is rather upon the *Spirits*, within the *Nerves*, to make them strive lesse; Than upon the *Bodily Substance* of the
965 *Nerves*.

I would have *Triall* made of two other *Kindes* of *Bracelets*, for *Comforting* the *Heart*, and *Spirits*; The one of the *Trochisch* of *Vipers*, made into little *Peeces* of *Beads*; For since they doe great Good Inwards, (especially for *Pestilent Agues*,) it is like they will be Effectuall Outwards; Where they may be applyed in greater *Quantity*. There would bee *Trochisch* likewise made of *Snakes*; Whose *Flesh dried*, is thought to have a very *Opening*, and *Cordiall Vertue*. The other is, of *Beads* made of the *Scarlet Powder*, which they call *Kermes*; Which is the Principall *Ingredient* in their *Cordiall Confection Alkermes*: The *Beads* would bee made up with *Amber-Grice*, and some
966 *Pomander*.

It hath beene long received, and confirmed by divers *Trialls*; That the Root of the *Male-Piony*, dried, tied to the *Necke*, doth help the *Falling-Sicknesse*; And likewise the *Incubus*, which we call the *Mare*. The *Cause* of both these *Diseases*, and especially of the *Epilepsie* from the *Stomach*, is the *Grossenesse* of the *Vapours*, which rise and enter into the *Cells* of the *Braine*: And therefore the *Working* is, by *Extreme*, and *Subtill Attenuation*; Which that *Simple* hath. I judge the like to bee in *Castoreum*, *Muske*, *Rew-Seed*, *Agnus*
967 *Castus Seed*, &c.

There is a *Stone*, which they call the *Bloud-Stone*, which worne is thought to be good for them that *Bleed* at the *Nose*: Which (no doubt) is by *Astriction*, and *Cooling* of the *Spirits*. *Quare*, if the *Stone* taken out of the *Toads*
968 *Head*, be not of the like Vertue; For the *Toad* loveth *Shade*, and Coolenesse.

Light may be taken from the *Experiment* of the *Horse-Tooth-Ring*, and the *Garland* of *Periwinckle*, how that those things, which asswage the *Strife* of the *Spirits*, do help diseases, contrary to the *Intention* desired: for in the *Curing* of the *Cramp*, the *Intention* is, to relax the *Sinewes*; But the *Contraction* of the *Spirits*, that they strive lesse, is the best Help: So to procure easie *Travailes* of *Women*, the Intention is to bring down the *Childe*; But the best Help is, to stay the *Comming downe* too *Fast*: Whereunto they say, the *Toad-Stone* likewise helpeth. So in *Pestilent Feavers*, the *Intention* is to expell the *Infection* by *Sweat*, and *Evapouration*; But the best *Meanes* to doe it, is by *Nitre*, *Diascordium*, and other *Coole Things*, which doe for a time arrest the *Expulsion*, till *Nature* can doe it more quietly. For as one saith prettily; *In the Quenching of the Flame of a Pestilent Ague, Nature is like People that come to quench the Fire of a House; which are so busie, as one of them letteth another.* Surely, it is an Excellent *Axiome*, and of Manifold *Vse*, that whatsoever appeaseth the *Contention* of the *Spirits*, furthereth their *Action*.

969 The *Writers* of *Naturall Magick*, commend the Wearing of the *Spoile* of a *Snake*, for *Preserving* of *Health*. I doubt it is but a *Conceit*; For that the Snake is thought to renue her *Youth*, by Casting her *Spoile*. They might as well take the *Beake* of an *Eagle*, or a Peece of a *Harts-Horne*, because those Renue.

970 It hath beene Anciently *Received*, (For *Pericles* the *Athenian* used it,) and it is yet in use, to weare little *Bladders* of *Quick-Silver*, or *Tablets* of *Arsenicke*, as *Preservatives* against the *Plague*: Not as they conceive, for any *Comfort* they yeeld to the *Spirits*, but for that being *Poysons* themselves, they draw the *Venome* to them, from the *Spirits*.

Vide the *Experiments* 95.96. and 97. touching the *Severall Sympathies*, and *Antipathies*, for *Medicinall Vse*. 971

It is said, that the *Guts* or *Skin* of a *Wolfe* being applyed to the *Belly*, doe cure the *Cholicke*. It is true, that the *Wolfe* is a *Beast* of great *Edacitie* and *Digestion*; And so, it may be, the *Parts* of him comfort the *Bowels*. 972

We see *Scare-Crowes*, are set up to keep *Birds* from *Corne*, and *Fruit*; It is reported by some, that the *Head* of a *Wolfe*, whole, dried, and hanged up in a *Dove-House*, will scare away *Vermine*; Such as are *Weasils*, *Polcats*, and the like. It may be, the *Head* of a *Dog* will doe as much; For those *Vermine* with us, know *Dogs* better than *Wolves*. 973

The *Braines* of some *Creatures*, (when their *Heads* are roasted) taken in *Wine*, are said to strengthen the *Memory*: As the *Braines* of *Hares*; *Braines* of *Hens*; *Braines* of *Deeres*, &c. And it seemeth to bee incident to the *Braines* of those *Creatures*, that are Fearefull. 974

The *Ointment*, that *Witches* use, is reported to be made, of the *Fat* of *Children*, digged out of their *Graves*; Of the *Iuyces* of *Smallage*, *Wolfe-Bane*, and *Cinquefoile*; Mingled with the *Meale* of fine *Wheat*. But I suppose, that the *Soporiferous Medicines* are likest to doe it; Which are *Henbane*, *Hemlocke*, *Mandrake*, *Moone-Shade*, *Tobacco*, *Opium*, *Saffron*, *Poplar-Leaves*, &c. 975 Witch ointment

It is reported by some, that the *Affections* of *Beasts*, when they are in Strength, doe adde some *Vertue*, unto *Inanimate Things*; As that the *Skin* of a *Sheep*, devoured by a *Wolfe*, moveth *Itching*; That a *Stone* bitten by a *Dog* in Anger, being throwne at him, drunke in *Powder*, provoketh *Choler*. 976

It hath beene observed, that the *Diet* of *Women* with *Childe*, doth worke much upon the *Infant*; As if the *Mother* eate *Quinces* much, and *Coriander-Seed*, (the *Nature* of both which is to represse and stay *Vapours*, that ascend to the *Braine*,) it will make the *Childe* Ingenious: And on the contrarie side, if the *Mother* eat (much) *Onions*, or *Beanes*, or such *Vapourous Food*; Or drinke *Wine*, or *Strong Drinke*, immoderately; Or *Fast* much; Or bee given to much *Musing*; (All which send, or draw *Vapours* to the *Head*,) It endangereth the *Childe* to become *Lunaticke*, or of *Imperfect Memory*: And I make the same Judgement of *Tobacco*, often taken by the *Mother*. 977

The *Writers* of *Naturall Magick* report, that the *Heart* of an *Ape*, worne neare the *Heart*, comforteth the *Heart*, and increaseth *Audacity*. It is true, that the *Ape* is a Merry and Bold *Beast*. And that the same *Heart* likewise of an *Ape* applyed to the *Necke*, or *Head*, helpeth the *Wit*; And is good for the *Falling-Sicknesse*: The *Ape* also is a Witty *Beast*, and hath a *Drie Braine*; Which may be some *Cause* of *Attenuation* of *Vapours* in the *Head*. Yet it is said to move *Dreames* also. It may be the *Heart* of a *Man* would doe more, but that it is more against *Mens* mindes to use it; Except it bee in such as weare the *Reliques* of *Saints*. 978

The *Flesh* of a *Hedge-Hog*, Dressed, and Eaten, is said to be a great *Drier*: It is true, that the *Iuyce* of a *Hedge-Hog*, must needs bee *Harsh*, and *Drie*, because it putteth forth so many *Prickles*: For *Plants* also, that are full of *Prickles*, are generally Dry: As *Briars*, *Thornes*, *Berberries*: And therefore the *Ashes* of an *Hedge-Hog* are said to be a great *Desiccative* of *Fistula's*. 979

Mummy hath great force in *Stanching* of *Bloud*; which, as it may be ascribed to the *Mixture* of *Balmes*, that are *Glutinous*; So it may also partake of a Secret *Proprietie*; In that the *Bloud* draweth *Mans Flesh*. And it is approved, that the *Mosse*, which groweth upon the *Skull* of a *Dead Man* unburied, will stanch *Bloud* Potently. And so doe the *Dregs*, or *Powder* of *Bloud*, severed from the *Water*, and *Dried*. 980

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981 It hath beene practised, to make *White Swallowes*, by *Anointing* of the *Egs* with *Oyle*. Which *Effect* may be produced, by the *Stopping* of the *Pores* of the *Shell*, and making the *Iuyce*, that putteth forth the *Feathers* afterwards, more Penurious. And it may be, the *Annointing* of the *Egs*, will be as Effectuall, as the *Annointing* of the *Body*; Of which *Vide* the *Experiment* 93.

982 It is reported, that the *White* of an *Egge*, or *Bloud*, mingled with *Salt-Water*, doth gather the *Saltnesse*, and maketh the *Water* sweeter. This may be by *Adhesion*; As in the 6. *Experiment* of *Clarification*: It may be also, that *Bloud*, and the *White* of an *Egge*, (which is the *Matter* of a *Living Creature*,) have some *Sympathy* with *Salt*: For all *Life* hath a *Sympathy* with *Salt*. Wee see that *Salt*, laid to a *Cut Finger*, healeth it; So as it seemeth *Salt* draweth *Bloud*, as well as *Bloud* draweth *Salt*.

983 It hath beene anciently received, that the *Sea Hare*, hath an *Antipathy* with the *Lungs*, (if it commeth neare the Body,) and erodeth them. Whereof the *Cause* is conceived to be, a *Qualitie* it hath of *Heating* the *Breath*, and *Spirits*; As *Cantharides* have upon the *Watry Parts* of the *Body*; As *Vrine* and *Hydropicall Water*. And it is a good *Rule*, that whatsoever hath an *Operation* upon certaine *Kindes* of *Matters*, that, in *Mans Body*, worketh most upon those *Parts*, wherein that kinde of *Matter* aboundeth.

984 Generally, that wich is *Dead*, or *Corrupted*, or *Excerned*, hath *Antipathy* with the same *Thing*, when it is *Alive*, and when it is *Sound*; And with those *Parts* which doe *Excerne*: As a *Carkasse* of *Man* is most *Infectious*, and *Odious* to *Man*; A *Carrion* of an *Horse* to an *Horse*, &c. *Purulent Matter* of *Wounds*, and *Vlcers*, *Carbuncles*, *Pocks*, *Scabs*, *Leprosie*, to *Sound Flesh*; And the *Excrement* of every *Species* to that *Creature* that *Excerneth* them. But the *Excrements* are lesse Pernicious than the *Corruptions*.

985 It is a Common *Experience*, that *Dogs* know the *Dog-Killer*; When as in times of *Infection*, some Petty *Fellow* is sent out to kill the *Dogs*; And that, though they have never seene him before, yet they will all come forth, and barke, and flie at him.

986 The *Relations* touching the *Force* of *Imagination*, and the *Secret Instincts* of *Nature*, are so uncertaine, as they require a great deale of *Examination*, ere we conclude upon them. I would have it first thorowly inquired, whether there be any Secret Passages of *Sympathy*, between *Persons* of *neare Bloud*; As *Parents*, *Children*, *Brothers*, *Sisters*, *Nurse-Children*, *Husbands*, *Wives*, &c. There be many Reports in *Historie*, that upon the *Death* of *Persons* of such Nearenesse, *Men* have had an inward *Feeling* of it. I my Selfe remember, that being in *Paris*, and my *Father* dying in *London*, two or three dayes before my *Fathers* death, I had a *Dreame*, which I told to divers *English Gentlemen*; That my *Fathers House*, in the *Countrey*, was *Plaistered* all over with *Blacke Mortar*. There is an Opinion abroad, (whether idle or no I cannot say,) That loving and kinde *Husbands*, have a *Sense* of their *Wives breeding Childe*, by some *Accident* in their owne *Bodie*.

987 Next to those that are *Neare* in *Bloud*, there may be the like *Passage*, and *Instincts* of *Nature*, betweene great *Friends*, and *Enemies*: And sometimes the Revealing is unto Another *Person*, and not to the *Partie* Himselfe. I remember *Philippus Commineus*, (a grave Writer,) reporteth; That the *Arch-Bishop* of *Vienna*, (a *Reverend Prelate*,) said (one day) after *Masse*, to *King Lewis* the eleventh of *France*; *Sir, your Mortall Enemy is dead*; What time *Duke Charles* of *Burgundy* was Slain, at the *Battell* of *Granson*, against the *Switzers*. Some triall also would be made, whether *Pact* or *Agreement* doe any thing; As if two *Friends* should agree, that such a *Day* in every *Weeke*, they being

being in farre *Distant Places*, should *Pray* one for Another; Or should put on a *Ring*, or *Tablet*, one for anothers Sake; Whether if one of them should breake their *Vow* and *Promise*, the other should have any *Feeling* of it, in *Absence*.

988 If there be any *Force* in *Imaginations* and *Affections* of *Singular Persons*; It is Probable the *Force* is much more in the *Ioynt Imaginations* and *Affections* of *Multitudes*: As if a *Victory* should be won, or lost, in *Remote Parts*, whether is there not some *Sense* thereof, in the *People* whom it concerneth; Because of the great *Ioy*, or *Griefe*, that many *Men* are possest with at once? *Pius Quintus*, at the very time, when that Memorable *Victory* was won, by the *Christians*, against the *Turkes*, at the *Navall Battell* of *Lepanto*, being then hearing of *Causes* in *Consistory*, brake off suddenly, and said to those about him, *It is now more time we should give thankes to God, for the great Victory he hath granted us, against the Turks*; It is true, that *Victory* had a *Sympathy* with his *Spirit*; For it was meerely his Worke, to conclude that *League*. It may be, that *Revelation* was *Divine*; But what shall we say then, to a Number of *Examples*, amongst the *Grecians*, and *Romans*? Where the *People*, being in *Theaters* at *Playes*, have had Newes of *Victories*, and *Overthrowes*, some few dayes, before any *Messenger* could come.

It is true, that that may hold in these Things, which is the generall *Root* of *Superstition*: Namely, that *Men* observe when *Things Hit*, and not when they *Misse*: And commit to Memorie the one, and forget and passe over the other. But touching *Divination*, and the *Misgiving* of *Mindes*, we shall speake more, when we handle in generall the *Nature* of *Mindes*, and *Soules*, and *Spirits*.

989 We have given formerly some *Rules* of *Imagination*; And touching the *Fortifying* of the Same. We have set downe also some few *Instances*, and *Directions*, of the *Force* of *Imagination*, upon *Beasts*, *Birds*, &c. upon *Plants*; And upon *Inanimate Bodies*: Wherin you must still observe, that your *Trialls* be upon *Subtill* and *Light Motions*, and not the contrary; For you will sooner, by *Imagination*, binde a *Bird* from *Singing*, than from *Eating*, or *Flying*: And I leave it to every *Man*, to choose *Experiments*, which himselfe thinketh most Commodious; Giving now but a few *Examples* of every of the Three Kindes.

990 Use some *Imaginant*, (observing the *Rules*, formerly prescribed,) for *Binding* of a *Bird* from *Singing*; And the like of a *Dogge* from *Barking*. Trie also the *Imagination* of some, whom you shall accommodate with things to fortifie it, in *Cocke-Fights*, to make one *Cocke* more Hardy, and the other more Cowardly. It would be tried also, in *Flying* of *Hawkes*; Or in *Coursing* of a *Deere*, or *Hart*, with *Grey-Hounds*; Or in *Horse-Races*; And the like *Comparative Motions*: For you may sooner by *Imagination*, quicken or slacke a *Motion*, than raise or cease it; As it is easier to make a *Dogge* goe slower, than to make him stand still that he may not runne.

991 In *Plants* also, you may trie the *Force* of *Imagination*, upon the *Lighter* Sort of *Motions*: As upon the Sudden *Fading*, or Lively *Comming up* of *Herbs*; Or upon their *Bending* one way, or other; Or upon their *Closing*, and *Opening*, &c.

992 For *Inanimate Things*, you may trie the *Force* of *Imagination*, upon Staying the

the *Working* of *Beere*, when the *Barme* is put in; Or upon the *Comming* of *Butter*, or *Cheese*, after the *Cherming*, or the *Rennet* be put in.

993 It is an Ancient *Tradition*, everie where alleaged, for *Example* of *Secret Proprieties* and *Influxes*, that the *Torpedo Marina*, if it be touched with a long Sticke, doth stupifie the *Hand* of him that toucheth it. It is one degree of *Working* at *Distance*, to work by the Continuance of a Fit *Medium*; As *Sound* will be conveyed to the *Eare*, by striking upon a *Bow-String*, if the *Horne* of the *Bow* be held to the *Eare*.

994 The *Writers* of *Naturall Magick*, doe attribute much to the *Vertues*, that come from the *Parts* of *Living Creatures*; So as they bee taken from them, the *Creatures* remaining still alive: As if the *Creature* still living did infuse some *Immateriate Vertue*, and *Vigour* into the *Part Severed*. So much may be true; that any *Part*, taken from a *Living Creature*, newly *Slaine*, may bee of greater force, than if it were taken from the like *Creature*, *dying* of it *Selfe*, because it is fuller of *Spirit*.

995 Triall would be made, of the like *Parts* of *Individualls*, in *Plants*, and *Living Creatures*; As to cut off a *Stock* of a *Tree*; And to lay that, which you cut off, to *Putrifie*, to see whether it will Decay the Rest of the *Stocke*: Or if you should cut off part of the *Taile*, or *Legge* of a *Dogge*, or a *Cat*, and lay it to *Putrifie*, and so see whether it will *Fester*, or keepe from *Healing*, the *Part* which remaineth.

996 It is received, that it helpeth to *Continue Love*, if one weare a *Ring*, or a *Bracelet* of the *Haire* of the *Party Beloved*. But that may be by the *Exciting* of the *Imagination*: And perhaps a *Glove*, or other like *Favour*, may as well doe it.

997 The *Sympathie* of *Individuals*, that have beene *Entire*, or have *Touched*, is of all others the most *Incredible*: Yet according unto our faithfull Manner of *Examination* of *Nature*, we will make some little mention of it. The *Taking away* of *Warts*, by *Rubbing* them with Somewhat that afterwards is put to waste, and consume, is a Common *Experiment*: And I doe apprehend it the rather, because of mine owne *Experience*. I had, from my *Childhood*, a *Wart* upon one of my *Fingers*: Afterwards when I was about Sixteen Yeares old, being then at *Paris*, there grew upon both my *Hands* a Number of *Warts*, (at the least an hundred,) in a Months space. The *English Embassadours Lady*, who was a *Woman* farre from *Superstition*, told me, one day; She would helpe me away with my *Warts*: Whereupon she got a *Peece* of *Lard*, with the *Skin* on, and rubbed the *Warts* all over with the *Fat Side*; And amongst the rest, that *Wart* which I had had from my *Childhood*; Then shee nailed the *Peece* of *Lard*, with the *Fat* towards the *Sunne*, upon a *Poast* of her *Chamber Window*, which was to the *South*. The Successe was, that within five weekes space, all the *Warts* went quite away: And that *Wart*, which I had so long endured, for Company. But at the rest I did little marvell, because they came in a Short time, and might goe away in a Short Time againe: But the Going away of that, which had staid so long, doth yet stick with me. They say the like is done by the *Rubbing* of *Warts* with a Green *Elder Sticke*, and then *Burying* the *Stick* to *Rot* in *Muck*. It would be tried, with *Cornes*, and *Wenns*, and such other *Excrescences*. I would have it also tried, with some *Parts* of *Living Creatures*, that are nearest the *Nature* of *Excrescences*; As the *Combs* of *Cocks*, the *Spurres* of *Cocks*, the *Hornes* of *Beasts*, &c. And I would have it tried both wayes; Both by *Rubbing* those *Parts* with *Lard*, or *Elder*, as before; And by *Cutting off* some *Peece* of those *Parts*, and laying it to *Consume*. To see whether it will Worke any Effect, towards the *Consumption* of that *Part*, which was once *Ioyned* with it.

It

998

It is constantly Received, and Avouched, that the *Anointing* of the *Weapon*, that maketh the *Wound*, will heale the *Wound* it selfe. In this *Experiment*, upon the Relation of *Men* of *Credit*, (though my selfe, as yet, am not fully inclined to beleeve it,) you shall note the *Points* following, First, the *Ointment*, wherewith this is done, is made of Divers *Ingredients*; whereof the Strangest and Hardest to come by, are the *Mosse* upon the *Skull* of a *dead Man*, *Vnburied*; And the *Fats* of a *Boare*, and a *Beare*, killed in the *Act* of *Generation*. These two last I could easily suspect to be prescribed as a Starting Hole; That if the *Experiment* proved not, it mought be pretended, that the *Beasts* were not killed in the due Time; For as for the *Mosse*, it is certain, there is great Quantity of it in *Ireland*, upon *Slaine Bodies*, laid on *Heaps*, *Vnburied*.) The other *Ingredients* are, the *Blood-Stone* in *Powder*, and some other *Things*, which seeme to have a *Vertue* to *Stanch Blood*; As also the *Mosse* hath. And the *Description* of the *whole Ointment* is to be found in *Chymicall Dispensatorie* of *Crollius*. Secondly, the same *Kinde* of *Ointment*, applied to the *Hurt* it selfe, worketh not the *Effect*; but onely applied to the *Weapon*. Thirdly, (which I like well) they doe not observe the *Confecting* of the *Ointment*, under any certaine *Constellation*; which commonly is the Excuse of *Magicall Medicines*, when they faile, that they were not made under a fit *Figure* of *Heaven*. Fourthly, it may bee applied to the *Weapon*, though the *Party Hurt* be at great *Distance*. Fiftly, it seemeth the *Imagination* of the Partie, to be *Cured*, is not needfull to Concurre; For it may be done, without the Knowledge, of the *Partie Wounded*; And thus much hath been tried, that the *Ointment* (for *Experiments* sake,) hath been wiped off the *Weapon*, without the Knowledge of the *Partie Hurt*, and presently the *Partie Hurt*, hath beene in great *Rage* of *Paine*, till the *Weapon* was *Reannointed*. Sixtly, it is affirmed, that if you cannot get the *Weapon*, yet if you put an *Instrument* of *Iron*, or *Wood*, resembling the *Weapon*, into the *Wound*, whereby it bleedeth, the *Annointing* of that *Instrument* will serve, and worke the *Effect*. This I doubt should be a Device, to keepe this strange *Forme* of *Cure*, in Request, and Use; Because many times you cannot come by the *Weapon* it selfe, Seventhly, the *Wound* must be at first *Washed cleane*, with *White Wine*, or the *Parties* owne *Water*; And then bound up close in *Fine Linnen*, and no more *Dressing* renewed, till it be *whole*. Eighthly, the *Sword* it selfe must be *Wrapped* up *Close*, as farre as the *Ointment* goeth, that it taketh no *Wind*. Ninthly, the *Ointment*, if you *wipe* it off from the *Sword*, and keepe it, will *Serve againe*; and rather *Increase* in *Vertue*, than *Diminish*. Tenthly, it will *Cure* in farre *Shorter Time*, than *Ointment* of *Wounds* commonly doe. Lastly, it will *Cure* a *Beast*, as well as a *Man*; which I like best of all the rest, because it subjecteth the *Matter*, to an *Easie Triall*.

Experiment Solitary, touching *Secret Proprieties*.

999

I Would have *Men* know, that though I reprehend, the *Easie Passing over*, of the *Causes* of *Things*, by Ascribing them to *Secret* and *Hidden Vertues*, and *Proprieties*; (For this hath arrested, and laid asleepe, all true *Enquiry*, and *Indications*;) yet I doe not understand, but that in the *Practicall Part* of *Knowledge*, much will be left to *Experience*, and *Probation*, whereunto *Indication* cannot so fully reach: And this not onely in *Specie*, but in *Individuo*. So in *Physicke*, if you will cure the *Iaundies*, it is not enough to say, that the *Medicine* must not be Cooling; For that will hinder the *Opening* which the *Disease* requireth: That it must not be *Hot*; For that will exasperate *Choler*: That it must goe to the *Gall*; For there is the *Obstruction* which causeth the *Disease*, &c. But you must receive from *Experience*, that *Powder* of *Chamæpytis*,

or the like, drunke in *Beere*, is good for the *Iaundies* : So againe, a wise *Physitian* doth not continue still the same *Medicine*, to a *Patient*; But he will vary, if the first *Medicine* doth not apparently succeed : For of those *Remedies* that are good for the *Iaundies*, *Stone*, *Agues*, &c. that will doe good in one *Body*, which will not do good in another; According to the Correspondence the *Medicine* hath to the *Individuall body*.

Experiment Solitary, touching the *Generall Sympathy* of *Mens Spirits*. 1000

THe *Delight* which *Men* have in *Popularitie*, *Fame*, *Honour*, *Submission*, and *Subjection* of other *Mens Mindes*, *Wills*, or *Affections* (although these *Things* may be desired for other *Ends*,) seemeth to be a *Thing*, in it selfe, without Contemplation of Consequence, Gratefull and agreeable to the *Nature* of *Man*. This Thing (surely) is not without some Signification, as if all *Spirits* and *Soules* of *Men*, came forth out of one *Divine Limbus*; Else why men be so much affected with that, which others thinke, or say? The best Temper of *Mindes* desireth *Good Name*, and *True Honour*: The Lighter, *Popularitie*, and *Applause*; The more depraved: *Subjection*, and *Tyranny*; As is seene in great *Conquerours*, and *Troublers* of the *World*: And yet more in *Arch-Heretickes*; for the Introducing of new *Doctrines*, is likewise an *Affectation* of *Tyranny*, over the *Vnderstandings*, and *Beleefes* of *Men*.

A TABLE

A Table of the Chiefe Matters contained in these Centuries.

A.

B.

C.

Com-

D.

Fas-

I

N.

Nou-

Seasons

Magni-

V.

W.

Y.

Z.

FINIS.

His Lops. Vſuall Receipt for the Gout, to which the Sixtieth Experiment hath reference, was this.

To be taken in this Order.

1. The Pultaſſe.

℞. *Of Manchett, about 3. Ounces, the Crumme onely, thin cut; Let it bee boyled in Milk, till it grow to a Pulp. Adde, in the end, a Dramme, and an halfe, of the powder of Red Roſes.*

Of Saffron 10. *Graines.*

Of Oyle of Roſes an Ounce.

Let it be ſpread upon a Linnen Cloth, and applied luke-warme; And continued for three Houres ſpace.

2. The Bath, or Fomentation.

℞. *Of Sage Leaves, halfe a handfull.*

Of the Root of Hemlock, Sliced, 6. Drams.

Of Briony Roots, half an Ounce.

Of the Leaves of Red Roſes, 2. Pugills.

Let them be boyled in a pottle of Water, wherein Steele hath beene quenched, till the Liquour come to a quart. After the Straining, put in halfe a handfull of Bay-Salt.

Let it be uſed, with Scarlet Cloth or Scarlet Wooll, dipped in the Liquour, hot, and ſo renewed ſeven times; All in the ſpace of a quarter of an Houre, or little more.

3. The Plaſter.

℞. Emplaſtrum Diacalciteos, *as much as is ſufficient, for the part you meane to cover. Let it be diſſolved with Oyle of Roſes, in ſuch a Conſiſtence, as will ſticke; And ſpred upon peece a of Holland, and applyed.*

His Lo^ds VIsall Receipt for the Gout, to which the Sixteenth Experiment hath reference, was this.

To be taken in this Order.

1. The Plaster.

R. Of Mandrake, about 3. Ounces, the Gummes onely, thin cut; Let it be boyled in Milk, till it grow to a Pulp. Adde, in the end, a Dramme, and an half, of the powder of Red Roses.

Of Saffron 10. Grains.

Of Oyle of Roses an Ounce.

Let it be spread upon a Linnen Cloth, and applied luke-warme; And continued for three Houres space.

2. The Bath, or Fomentation.

R. Of Sage Leaves, half a handfull.

Of the Root of Hemlock, Sliced, 6. Drams.

Of Briony Roots, half an Ounce.

Of the Leaves of Red Roses, 2. Pugills.

Let them be boyled in a pottle of Water, wherein Steele hath been quenched, till the Liquour come to a quart. After the Straining, put in half a handfull of Bay-Salt.

Let it be used, with Scarlet Cloth or Scarlet Wooll, dipped in the Liquour, hot, and so renewed seven times; Allin the space of a quarter of an Houre, or little more.

3. The Plaster.

R. Emplastrum Diacalciteos, as much as is sufficient, for the part you meane to cover. Let it be disfolded with Oyle of Roses, in lieu of a Consistence, as will sticke; And spread upon peece of Holland, and applyed.

NEVV ATLANTIS.

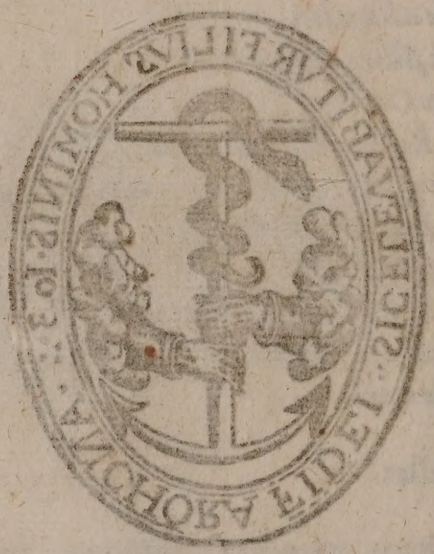
A VVorke unfinished.

VVritten by the Right Honourable, FRANCIS, *Lord Verulam, Viscount* St. *Alban.*

NEW ATLANTIS.

A Work unfinished.

Written by the Right Honourable FRANCIS, Lord Verulam, Viscount St. Alban.



To the Reader.

THis *Fable* my *Lord* devised, to the end that Hee might exhibit therein, a *Modell* or *Description* of a *College*, instituted for the *Interpreting* of *Nature*, and the Producing of *Great* and *Marvellous Workes*, for the *Benefit* of *Men*; Vnder the Name of *Salomons House*, or the *College of the Six Dayes Workes*. And even so farre his *Lordship* hath proceeded, as to finish that Part. Certainly the Modell is more Vast, and High, than can possibly be imitated in all things; Notwithstanding most Things therein are within Mens Power to effect. His *Lordship* thought also in this present *Fable*, to have composed a *Frame* of *Lawes*, or of the *best State* or *Mould* of a *Common-wealth*; But fore-seeing it would be a long VVork, his Desire of Collecting the *Naturall History* diverted him, which He preferred many degrees before it.

This VVorke of the *New Atlantis* (as much as concerneth the *English Edition*) his *Lordship* designed for this place; In regard it hath so neare Affinitie (in one part of it) with the Preceding *Naturall History*.

W. Rawley.

To the Reader.

THis Fable my Lord devised, to the end that Hee might exhibit therein, a Model or Delineation of a College, instituted for the Preserving of Peace, and the Producing of Great and Marvellous Works, for the Benefit of Men; Under the Name of Salomon's House, or the College of the Six Dayes Works. And even so fare his Lordship hath proceeded, as to finish that Part, Certainly the Model is more Vast, and High, than can possibly be imitated in all things; Notwithstanding most Things therein are within Mens Power to effect. His Lordship thought also in this present Fable, to have composed a Frame of Lawes, or of the best State or Model of a Common-wealth; But fore-seeing it would be a long Work, his Desire of Collecting the Naturall History diverted him, which He preferred many degrees before it.

This Worke of the New Atlantis (as much as concerneth the English Edition) his Lordship designed for this place; In regard it hath so neere Affinitie (in one part of it) with the Preceding Naturall History.

W. Rawley.

NEW ATLANTIS

WE E ſailed from *Perú*, (where we had continued by the ſpace of one whole yeare,) for *China* and *Iapan*, by the South Sea; taking with us Victuals for twelve Moneths; And had good Winds from the Eaſt, though ſoft and weake, for five Moneths ſpace and more. But then the Wind came about, and ſetled in the Weſt for many dayes, ſo as we could make little or no Way, and were ſometimes in purpoſe to turne backe. But then againe there aroſe Strong and Great winds from the South, with a Point Eaſt; which carried us up, (for all that we could doe) towards the North: By which time our Victuals failed us, though wee had made good ſpare of them. So that finding our ſelves, in the Midſt of the greateſt Wilderneſſe of waters in the world, without Victuall, wee gave our Selves for loſt Men, and prepared for death. Yet we did lift up our Hearts and Voices to GOD above, *who ſheweth his Wonders in the Deepe*; Beſeeching him of his Mercy, that as in the *Beginning* He diſcouered the *Face* of the *Deepe*, and brought forth *Drie-Land*; So he would now diſcover Land to us, that we mought not periſh. And it came to paſſe, that the next day about Evening, we ſaw within a Kenning before us, towards the North, as it were thicke-Clouds, which did put us in ſome hope of Land; Knowing how that part of the South-Sea was utterly unknowne; And might have Iſlands or Continents, that hitherto were not come to light. Wherefore we bent our courſe thither, where wee ſaw the appearance of Land, all that night; And in the Dawning of the next Day, wee might plainly diſcerne that it was a Land, Flat to our ſight, and full of Boſcage; which made it ſhew the more Darke. And after an Houre and a halfes Sayling, wee entred

tred into a good *Hauen*, being the Port of a faire *City*: Not great indeed, but well built, and that gave a pleasant view from the Sea: And we thinking every Minute long, till wee were on Land, came close to the Shore and offered to land. But straightwayes wee saw divers of the People, with Bastons in their Hands, (as it were) forbidding vs to land; Yet without any Cryes or Fiercenesse, but only as warning vs off, by Signes that they made. Whereupon being not a little discomforted, wee were advising with our selves, what wee should doe. During which time, there made forth to us a small Boat, with about eight Persons in it; whereof One of them had in his Hand a Tipstaffe of of a yellow Cane, tipped at both ends with Blew, who made aboard our Ship, without any shew of Distrust at all. And when he saw one of our Number, present himselfe somewhat afore the rest, hee drew forth a little Scroule of Parchment (somewhat yellower than our Parchment, and shining like the Leaves of Writing Tables, but otherwise soft and flexible,) and delivered it to our formost Man. In which Scroule were written in Ancient *Hebrew*, and in Ancient *Greeke*, and in good *Latine* of the Schoole, and in *Spanish* these words; *Land ye not, none of you, and provide to be gone, from this Coast, within sixteen dayes, except you have further time given you: Meane-while, if you want Fresh Water, or Victuall, or helpe for your Sicke, or that your Ship needeth repaire, write downe your wants, and you shall have that which belongeth to Mercy.* This Scroule was signed with a Stamp of *Cherubims Wings*, not spred, but hanging downwards; And by them a *Crosse*. This being delivered, the *Officer* returned, and left onely a Servant with us to receive our Answer. Consulting hereupon amongst our Selves, wee were much perplexed. The Deniall of Landing, and Hasty Warning us away, troubled us much; On the other side, to finde that the People had Languages, and were so full of Humanity, did comfort us not a little. And above all, the Signe of the *Crosse* to that Instrument, was to us a great Rejoycing, and as it were a certaine Presage of Good. Our Answer was in the *Spanish* tongue; *That for our Ship, it was well; For we had rather met with Calmes and contrary winds, than any Tempests. For our Sicke, they were many, and in very ill Case; So that if they were not permitted to Land, they ranne in danger of their Lives.* Our other Wants wee set downe in particular, adding; *That we had some little store of Merchandize, which if it pleased them to deale for, it might supply our Wants, without being chargeable*

ble unto them. Wee offered ſome Reward in Piſtolets unto the Servant, and a peece of Crimſon Velvet to bee preſented to the *Officer:* But the Servant tooke them not, nor would ſcarce looke upon them; And ſo left us, and went back in another little Boat which was ſent for him.

About three Houres after wee had diſpatched our Anſwer, there came towards us, a Perſon (as it ſeemed,) of place. Hee had on him a Gowne with wide Sleeves, of a kinde of Water Chamolet, of an excellent Azure Colour, farre more gloſſy than ours: His under Apparell was greene; and ſo was his Hat, being in the forme of a Turban, daintily made, and not ſo huge as the *Turkiſh* Turbans; And the Locks of his Haire came down below the Brimmes of it. A Reverend Man was he to behold. Hee came in a Boat, gilt in ſome part of it, with foure Perſons more onely in that Boat; And was followed by another Boat, wherein were ſome Twenty. When hee was come within a Flight-ſhot of our Ship, Signes were made to us, that we ſhould ſend forth ſome to meet him upon the water, which we preſently did in our Ship-Boat, ſending the principall Man amongſt us ſave one, and foure of our Number with him. When wee were come within ſixe yards of their Boat, they called to us to ſtay, and not to approach further, which we did. And thereupon the Man, whom I before deſcribed, ſtood up, and with a loud voice in *Spaniſh*, asked, *Are ye Chriſtians?* Wee anſwered; *We were*; fearing the leſſe, becauſe of the *Croſſe* we had ſeene in the Subſcription. At which Anſwer the ſaid Perſon lift up his Right Hand towards Heaven, and drew it ſoftly to his Mouth (which is the Geſture they uſe, when they thanke GOD;) And then ſaid: *If ye will ſweare, (all of you,) by the Merits of the* SAVIOUR, *that ye are no Pirates; Nor have ſhed bloud, lawfully, nor unlawfully, within forty dayes paſt; you may have Licenſe to come on Land.* We ſaid; *We were all ready to take that Oath.* Whereupon one of thoſe that were with him, being (as it ſeemed) a *Notary*, made an Entry of this Act. Which done, another of the Attendants of the Great Perſon, which was with him in the ſame Boat, after his Lord had ſpoken a little to him, ſaid aloud; *My Lord would have you know, that it is not of Pride, or Greatneſſe, that he commeth not aboard your Ship; But for that, in your Anſwer, you declare, that you have many Sicke amongſt you, he was warned by the* Conſervatour *of* Health, *of the* City, *that hee ſhould keepe a diſtance.* Wee bowed our ſelves towards him, and anſwered; *Wee*

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were his humble Servants; And accounted for great Honour, and singular Humanitie towards us, that which was already done; But hoped well, that the Nature of the Sicknesse, of our Men, was not infectious. So he returned; And a while after came the *Notary* to us aboard our Ship; Holding in his hand a Fruit of that Country, like an Orenge, but of colour between Orenge-tawny and Scarlet; which cast a most excellent Odour. Hee used it (as it seemeth) for a Preservative against Infection. He gave us our Oath; *By the Name of Jesus, and his Merits:* And after told us, that the next day by sixe of the Clocke in the Morning, wee should be sent to, and brought to the *Strangers House*, (so hee called it,) where we should be accommodated of things, both for our Whole, and for our Sicke. So he left us; And when we offered him some Pistolets, he smiling, said; *Hee must not bee twice paid for one Labour:* Meaning (as I take it) that he had Salary sufficient of the *State* for his Service. For (as I after learned) they call an Officer that taketh Rewards, *Twice-paid.*

The next Morning early, there came to us the same *Officer*, that came to us at first with his Cane, and told us; *Hee came to conduct us to the* Strangers House; *And that he had prevented the Houre, because we might have the whole day before us, for our Businesse. For* (said hee) *If you will follow my Advice, there shall first goe with me some few of you, and see the place, and how it may be made convenient for you; And then you may send for your Sick, and the rest of your Number, which ye will bring on Land.* Wee thanked him, and said; *That this Care, which he tooke of desolate Strangers,* GOD *would reward.* And so sixe of us went on Land with him: And when wee were on Land, hee went before us, and turned to us, and said; *He was but our Servant, and our Guide.* Hee led us through three faire Streets; And all the Way wee went, there were gathered some People on both sides, standing in a Row; But in so civill a fashion, as if it had beene, not to wonder at us, but to welcome us; And divers of them, as wee passed by them, put their Armes a little abroad; which is their Gesture, when they bid any welcome. The *Strangers House* is a faire and spacious House, built of Brick, of somewhat a blewer Colour than our Brick; And with handsome Windowes, some of Glasse, some of a kinde of Cambrick oyled. Hee brought us first into a faire Parlour above staires, and then asked us; *VVhat number of Persons we were? And how manie sicke?* we answered, *VVe were in all (sick and whole) one and fiftie Persons, whereof*

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our sicke were seventeene. He desired us to have patience a little, and to stay till he came backe to us; which was about an Houre after; And then he led us to see the Chambers, which were provided for us, being in number nineteene. They having cast it (as it seemeth) that foure of those Chambers, which were better than the rest, might receive four of the principall Men of our Company; And lodge them alone by themselves; And the other fifteene Chambers were to lodge us, two and two together. The Chambers were handsome and chearefull Chambers, and furnished civilly. Then he led us to a long Gallery, like a Dorture, where hee shewed us all along the one side (for the other side was but wall and window,) seventeene Cells, very neat ones, having partitions of Cedar wood. Which Gallery, and Cells, being in all forty, (many more than we needed,) were instituted as an Infirmary for sick Persons. And he told us withall, that as any of our Sick waxed well, hee might bee removed from his Cell, to a Chamber: For which purpose there were set forth ten spare Chambers, besides the Number we spake of before. This done, he brought us backe to the Parlour, and lifting up his Cane a little, (as they do when they give any Charge or Command) said to us; *Yee are to know that the Custome of the Land requireth, that after this day, and to morrow, (which we give you for removing your People from your Ship,) you are to keepe within doores for three daies. But let it not trouble you, nor doe not thinke your selves restrained, but rather left to your Rest and Ease. You shall want nothing, and there are sixe of our People appointed to attend you, for any Businesse you may have abroad.* Wee gave him thankes, with all Affection and Respect, and said; *GOD surelie is manifested in this Land.* We offered him also twenty Pistolets; But he smiled, and onely said; *What? Twice Paid!* And so hee left us. Soone after our Dinner was served in; Which was right good Viands, both for Bread, and Meat: Better than any *Collegiate* Diet, that I have knowne in *Europe*. We had also Drinke of three sorts, all wholesome and good; Wine of the Grape; A Drinke of Graine, such as is with us our Ale, but more cleare: and a kind of Sider made of a fruit of that Countrey; A wonderfull pleasing and Refreshing Drink. Besides, there were brought in to us, great Store of those Scarlet Orenges, for our Sicke; which (they said) were an assured Remedy for sicknesse taken at Sea. There was given us also, a Box of small gray, or whitish Pills, which they wished our Sicke should take, one of the Pills

every night before sleep; which (they said) would hasten their Recovery. The next day, after that our Trouble of Garriage, and Removing of our Men, and Goods out of our Ship, was somewhat setled and quiet, I thought good to call our Company together; and when they were assembled, said unto them; *My deare Friends; Let us know our selves, and how it standeth with us. We are Men cast on Land, as* Jonas *was, out of the* Whales Belly, *when we were as buried in the Deepe: And now wee are on Land, we are but betweene death and Life; For wee are beyond, both the Old World and the New; And whether ever we shall see* Europe, *GOD onely knoweth. It is a kinde of Miracle hath brought us hither: And it must be little lesse, that shall bring us hence. Therefore in regard of our Deliverance past, and our danger present, and to come, let us looke up to GOD, and every man reforme his owne waies. Besides we are come here amongst a* Christian People, *full of Pietie and Humanitie: Let us not bring that Confusion of face upon our selves, as to shew our vices, or unworthinesse before them. Yet there is more: For they have by Commandement, (though in forme of Courtesie) Cloystred us within these Walls for three daies: Who knoweth, whether it be not, to take some taste of our manners and conditions? And if they finde them bad, to banish us straight-waies; if good, to give us further time. For these Men, that they have given us for Attendance, may withall have an eye upon us. Therefore for GODS love, and as wee love the weale of our Soules and Bodies, let us so behave our selves, as we may be at peace with GOD, and may finde grace in the Eyes of this People.* Our Company with one voyce thanked me for my good Admonition, and promised me to live soberly and civilly, and without giving any the least occasion of Offence. So we spent our three dayes joyfully, and without care, in expectation what would be done with us, when they were expired. During which time, we had every houre joy of the Amendment of our Sick; who thought themselves cast into some Divine *Poole* of *Healing*; They mended so kindly, and so fast.

The Morrow after our three dayes were past, there came to us a new Man, that we had not seene before, clothed in Blew as the former was, save that his Turban was white with a small red Crosse on the Topp. Hee had also a Tippet of fine Linnen. At his Comming in, he did bend to us a little, and put his Armes abroad. We of our Parts saluted him in a very lowly and submissive manner; As looking that from him we should receive Sentence of Life, or Death. Hee desired to speake with

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some few of us: Whereupon sixe of us onely stayed, and the rest avoided the Roome. He said; *I am by Office Governour of this House of Strangers, and by Vocation I am a* Christian Priest; *And therefore am come to you, to offer you my service, both as Strangers, and chiefly as* Christians. *Some things I may tell you, which I think you will not be unwilling to heare. The State hath given you Licence to stay on Land for the space of sixe weeks: And let it not trouble you, if your occasions aske further time, for the Law in this point is not precise; And I doe not doubt, but my selfe shall be able to obtaine for you such further time, as may be convenient. Yee shall also understand, that the* Strangers House, *is at this time Rich, and much aforehand; For it hath laid up Revenew these 37. yeares: For so long it is since any Stranger arrived in this part: And therefore take ye no care, The* State *will defray you all the time you stay: Neither shall you stay one day the lesse for that. As for any Merchandize you have brought, ye shall be well used, and have your returne, either in Merchandize, or in Gold and Silver: For to us it is all one. And if you have any other Request to make, hide it not. For ye shall finde, we will not make your Countenance to fall, by the answer ye shall receive. Onely this I must tell you, that none of you must goe above a* Karan, (that is with them a Mile and an halfe) *from the walls of the Citie, without speciall leave.* Wee answered, after wee had looked a while upon one another, admiring this gracious and parent-like usage, *That we could not tell what to say: For we wanted words to expresse our Thanks, And his Noble free Offers left us nothing to aske. It seemed to us, that we had before us a picture of our* Salvation *in* Heaven: *For we that were a while since in the Lawes of Death, were now brought into a place, where we found Nothing but Consolations. For the Commandement laid upon us, we would not faile to obey it, though it was impossible but our Hearts should be enflamed to tread further upon this Happie and Holie Ground.* We added; *That our Tongues should first cleave to the Roofes of our Mouthes, ere wee should forget, either his Reverend Person, or this whole nation, in our Prayers.* We also most humbly besought him to accept of us as his true servants, by as just a Right, as ever Men on Earth were bounden; laying and presenting, both our Persons, and all we had at his feet. He said; *He was a Priest, and looked for a Priests reward, which was our Brotherly love, and the good of our Soules and Bodies.* So he went from us, not without Teares of Tendernesse in his Eyes; And left us also confused with joy and kindnesse, saying amongst our selves, *That we were come into a land of Angels,*

which did appeare to us daily, and prevent us with Comforts, which we thought not of, much lesse expected.

The next day about ten of the Clocke, the Governour came to us againe, and after Salutations, said familiarly; *That he was come to visit us*; And called for a Chaire, and sat him downe; And we being some ten of us (the rest were of the meaner sort; or else gone abroad;) sate downe with him; And when wee were sett, he began thus. *We of this Island of Bensalem* (for so they call it in their Language) *have this; That by meanes of our solitary Situation; and of the Lawes of Secrecy, which we have for our Travellers, and our rare Admission of Strangers; we know well most part of the Habitable World, and are our selves unknowne. Therefore because he that knoweth least, is fittest to aske Questions, it is more Reason, for the Entertainment of the time, that ye aske mee Questions, than that I aske you.* Wee answered; *That we humbly thanked him, that he would give us leave so to doe: And that wee conceived by the taste we had already, that there was no worldly thing on Earth, more worthy to bee knowne, than the State of that happy Land. But above all* (we said) *since that we were met from the severall Ends of the world; and hoped assuredly, that we should meet one day in the* Kingdome *of* Heaven (*for that we were both Parts* Christians) *we desired to know (in respect that Land was so remote, and so divided by vast and unknowne Seas; from the Land, where our SAVIOVR walked on Earth) who was the* Apostle *of that Nation, and how it was converted to the faith?* It appeared in his face, that he tooke great Contentment in this our Question: He said; *Yee knit my Heart to you, by asking this Question in the first place; For it sheweth that you* First seeke the Kingdome of Heaven; *And I shall gladly, and briefly, satisfie your demand.*

About twenty Yeares after the Ascention of our SAVIOVR, it came to passe, that there was seene by the people of Renfusa, *(a City upon the Easterne Coast of our Island, within night, (the Night was Cloudy and Calme,) as it might be some mile in the Sea, a great Pillar of Light; Not sharpe, but in forme of a Columne, or* Cylinder, *rising from the Sea, a great way up towards Heaven; and on the topp of it was seene a large Crosse of Light, more bright and resplendent than the Body of the Pillar. Vpon vvhich so strange a Spectacle, the People of the City gathered apace together upon the Sands, to wonder; And so after put themselves into a number of small Boats to goe nearer to this Marveilous sight. But vvhen the Boats vvere come vvithin (about) sixty yards of the Pillar, they found themselves all*

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bound, and could goe no further, yet so as they might move to goe about, but might not approach nearer: So as the Boats stood all as in a Theater, beholding this Light, as an Heavenly Signe. It so fell out, that there was in one of the Boats, one of the Wise Men, of the Society of Salomons House; *which* House *or* College, *(my good Brethren) is the very Eye of this Kingdome; Who having a while attentively and devoutly viewed, and contemplated this Pillar and Crosse, fell downe upon his face; And then raised himselfe upon his knees, and lifting up his Hands to Heaven, made his prayers in this manner.*

LOrd God of Heaven and Earth; thou hast vouchsafed of thy Grace, to those of our Order, *to know thy Workes of Creation, and the Secrets of them; And to discerne (as farre as appertaineth to the Generations of Men) between Divine Miracles, Workes of Nature, Workes of Art, and Impostures, and Illusions of all sorts. I doe here acknowledge and testifie before this People, that the Thing we now see before our eyes, is thy* Finger, *and a true* Miracle. *And for-as-much, as wee learne in our Books, that thou never Workest Miracles, but to a Divine and Excellent End, (for the Lawes of Nature are thine owne Lawes, and thou exceedest them not but upon great cause) we most humbly beseech thee, to prosper this great Signe, And to give us the Interpretation and use of it in Mercy; Which thou dost in some part secretly promise, by sending it unto us.*

When hee had made his Prayer, he presently found the Boate hee was in, moveable and unbound; whereas all the rest remained still fast; And taking that for an assurance of Leave to approach, hee caused the Boate to be softly, and with silence rowed towards the Pillar. *But ere he came neare it, the* Pillar *and* Crosse *of* Light *brake up, and cast it selfe abroad, as it were into a Firmament of many Starres; which also vanished soone after, and there was nothing left to be seene, but a small* Arke, *or* Chest *of* Cedar, *dry, and not wet at*

all with vvater, though it swam. And in the Fore-end of it, which was towards him, grew a small greene Branch of Palme; And when the wise man had taken it with all reverence, into his Boat, it opened of it selfe, and there were found in it, a Book, *and a* Letter; *Both written in fine Parchment, and wrapped in Sindons of Linnen. The* Book *contained all the* Canonicall Books *of the* Old *and* New Testament, *according as you have them; (For we know well what the* Churches *with you receive;) And the* Apocalypse *it selfe; And some other* Books *of the* New Testament, *which were not at that time vvritten, vvere nevertheless in the* Booke. *And for the* Letter, *it vvas in these vvords.*

I Bartholomew, *a Servant of the Highest, and Apostle of IESVS CHRIST, was warned by an Angell that appeared to me, in a vision of Glory, that I should commit this* Arke *to the flouds of the Sea. Therefore I doe testifie and declare, unto that People, where GOD shall ordaine this* Arke *to come to Land, that in the same day is come unto them Salvation, and Peace, and Good Will, from the* Father, *and from the LORD IESVS.*

There was also in both these Writings, as vvell the Booke, *as the* Letter, *wrought a great Miracle, Conforme to that of the* Apostles, *in the Originall* Gift *of* Tongues. *For there being at that time, in this Land,* Hebrews, Persians, *and* Indians, *besides the Natives, every one read upon the* Booke, *and* Letter, *as if they had been writen in his owne Language. And thus was this Land saved from infidelitie; (as the Remnant of the Old World was from Water) by an* Arke, *through the Apostolicall and Miraculous* Euangelisme *of* S. Bartholomew. And here he paused, and a Messenger came, and called him forth from us. So this was all that passed in that Conference.

The next Day, the same Governour came againe to us, immediately after Dinner, and excused himselfe, saying; *That the Day before he was called from us somewhat abruptly, but now hee would make us amends, and spend time with us, if wee held his Company and Conference agreeable;* We answered; *That we held it so agreeable and pleasing to us, as wee forgot both Dangers past, and*

Feares to come, for the time wee heard him speake; And that wee thought an Houre spent vvith him, was worth Yeares of our former life. Hee bowed himselfe a little to us, and after we were sett againe, he said; *Well, the Questions are on your part.* One of our Number said, after a little Pause; *That there was a Matter, wee were no lesse desirous to know, than fearefull to aske, least wee might presume too farre. But encouraged by his rare Humanity towards us, (that could scarce thinke our selves Strangers, being his vowed and professed Servants,) wee would take the Hardinesse to propound it: Humbly beseeching him, if hee thought it not fit to bee answered, that he would pardon it, though he rejected it.* We said; *We well observed those his words, vvhich he formerly spake, that this happy Island, vvhere we now stood, was knowne to few, and yet knew most of the Nations of the World, vvhich we found to bee true, considering they had the Languages of* Europe, *and knew much of our State and Businesse; And yet we in* Europe *(notwithstanding all the remote Discoveries, and Navigations of this last Age) never heard any of the least Inkling or Glimpse of this Island. This vve found vvonderfull strange; For that all Nations have Enterknowledge one of another, either by Voyage into Forraine Parts, or by Strangers that come to them: And though the Traveller into a Forreine Countrey, doth commonly know more by the Eye, than he that stayeth at home can by relation of the Traveller; Yet both vvayes suffice to make a mutuall Knowledge, in some degree, on both parts. But for this Island, vvee never heard tell of any Ship of theirs, that had been seen to arrive upon any shore of* Europe; *No, nor of either the* East *or* West Indies, *nor yet of any Ship of any other part of the World, that had made returne from them. And yet the Marvell rested not in this. For the Situation of it (as his Lordship said,) in the secret Conclave of such a vast Sea mought cause it. But then, that they should have Knowledge of the Languages, Bookes, Affaires, of those that lye such a distance from them, it vvas a thing wee could not tell vvhat to make of; For that it seemed to us a condition and Proprietie of Divine Powers and Beings, to be hidden and unseene to others, and yet to have others open, and as in a light to them.* At this speech the Governour gave a gracious smile & said; *That we did well to ask pardon for this Question we now asked; For that it imported, as if we thought this Land a Land of Magicians, that sent forth Spirits of the Ayre into all parts, to bring them Newes, and Intelligence of other Countries.* It was answered by us all, in all possible humblenesse, but yet with a Countenance taking knowledge, that we knew that

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he spake it but merrily. *That we were apt enough to thinke, there was somewhat supernaturall in this Island, but yet rather as Angelicall, than Magicall. But to let his Lordship know truely, vvhat it was that made us tender and doubtfull to aske this Question, it vvas not any such conceit, but because wee remembred, hee had given a Touch in his former Speech, that this Land had Lawes of Secrecy touching Strangers:* To this he said; *You remember it aright: And therefore in that I shall say to you, I must reserve some particulars, vvhich it is not lawfull for me to reveale; but there will be enough left, to give you satisfaction.*

You shall understand (that vvhich perhaps you vvill scarce thinke credible) that about three thousand Yeares agoe, or somewhat more, the Navigation of the World (specially for remote Voyages) was greater than at this Day. Doe not thinke with your selves, that I know not how much it is increased with you, within these threescore Years: I know it well; And yet I say, greater then, than now: Whether it was, that the Example of the Arke, *that saved the Remnant of Men, from the* universall Deluge, *gave Men confidence to adventure upon the Waters; Or what it was; but such is the truth. The* Phœnicians, *and specially the* Tyrians, *had great Fleets. So had the* Carthaginians *their Colony, which is yet further West. Toward the East the Shipping of* Egypt, *and of* Palestina, *was likewise great.* China *also, and the great* Atlantis, *(that you call* America) *which have now but Iunks, and Canoa's, abounded then in tall Ships. This Island, (as appeareth by faithfull Registers of those times) had then fifteene hundred strong Ships, of great content. Of all this, there is with you sparing Memory, or none; But wee have large Knowledge thereof.*

At that time, this Land was knowne and frequented by the Ships and Vessels of all the Nations before named. And (as it commeth to passe) they had many times Men of other Countries, that were no Saylers, that came with them; As Persians, Chaldeans, Arabians; *So as almost all Nations of Might and Fame resorted hither; Of whom, we have some Stirps, and little Tribes with us; at this day. And for our owne Ships, they went sundry Voyages, as well to your* Streights, *which you call the* Pillars *of* Hercules, *As to other parts in the* Atlantique *and* Mediterrane Seas; *As to* Paguin, *(which is the same with* Cambalaine) *and* Quinzy, *upon the Orientall Seas, as farre as to the Borders of the East* Tartary.

At the same time, and an Age after, or more, the Inhabitants of the great Atlantis *did flourish. For though the Narration and De-*

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ſcription which is made by a great Man *with you, that the Deſcendents of* Neptune *planted there; and of the Magnificent Temple, Pallace, City, and Hill; and the manifold ſtreames of goodly Navigable Rivers, (which as ſo many Chaines invironed the ſame Site, and Temple; And the ſeverall Degrees of Aſcent, whereby Men did climbe up to the ſame, as if it had beene a* Scala Cœli; *be all Poeticall and Fabulous: Yet ſo much is true, that the ſaid Countrey of* Atlantis; *As well that of* Peru *then called* Coya, *as that of* Mexico *then named* Tyrambel, *were mighty and proud Kingdomes, in Armes, Shipping, and Riches: So mighty, as at one time, (or at leaſt within the ſpace of ten yeares,) they both made two great Expeditions; They of* Tyrambel *through the* Atlantique *to the* Mediterrane Sea; *and they of* Coya, *through the South Sea upon this our Iſland: And for the former of theſe, which was into* Europe, *the ſame Author amongſt you, (as it ſeemeth) had ſome relation from the Ægyptian Prieſt, whom he citeth. For Aſſuredly, ſuch a thing there was. But whether it were the Ancient* Athenians, *that had the glory of the Repulſe, and Reſiſtance of thoſe Forces, I can ſay nothing: But certaine it is, there never came backe, either Ship, or Man, from that Voyage. Neither had the other Voyage of thoſe of* Coya *upon us, had better fortune, if they had not met with Enemies of greater clemency. For the King of this Iſland, (by name* Altabin,) *a wiſe Man, and a great Warrier; Knowing well both his owne ſtrength, and that of his Enemies; handled the matter ſo, as he cut off their Land-Forces from their Ships, and entoyled both their Navy, and their Campe, with a greater Power than theirs, both by Sea and Land: And compelled them to render themſelves without ſtriking ſtroke: And after they were at his Mercy, contenting himſelfe onely with their Oath, that they ſhould no more beare Armes againſt him, diſmiſſed them all in ſafetie. But the* Divine Revenge *overtooke not long after thoſe proud Enterpriſes. For within leſſe than the ſpace of one Hundred Yeares, the* Great Atlantis *was utterly loſt and deſtroyed: Not by a great Earthquake, as your* Man *ſaith; (For that whole Tract is little ſubject to Earthquakes;) But by a particular Deluge, or Inundation; Thoſe Countries having, at this Day, farre greater Rivers, and farre higher Mountaines, to powre downe Waters, than any part of the Old World. But it is true, that the ſame Inundation was not deepe; Not paſt forty foot, in moſt places, from the Ground; So that, although it deſtroyed Man and Beaſt generally, yet ſome few wild Inhabitants of the Wood eſcaped. Birds alſo were ſaved by flying to the High Trees and Woods. For as for Men, although they had*

Buildings in many places, higher than the Depth of the Water; Yet that Inundation, though it were shallow, had a long Continuance; whereby they of the Vale, that were not drowned, perished for want of Food, and other things necessary. So as marvell you not at the thinne Population of America, nor at the Rudenesse and Ignorance of the People; For you must account your Inhabitants of America as a yong People; younger a thousand yeares, at the least, than the rest of the World: For that there was so much time, betweene the Universall Floud, and their Particular Inundation. For the poore Remnant of Humane Seed, which remained in their Mountaines, Peopled the Countrey again slowly, by little and little; And being simple and a savage People (Not like Noah and his Sonnes, which was the chiefe Family of the Earth) they were not able to leave Letters, Arts, and Civilitie to their Posteritie; And having likewise in their Montainous Habitations been used, (in respect of the Extreme Cold of those Regions,) to cloath themselves with the Skinnes of Tygers, Beares, and great Hairy Goats, that they have in those Parts; When after they came downe into the Valley, and found the intolerable Heats which are there, and knew no meanes of lighter Apparell; they were forced to begin the custome of Going Naked, which continueth at this day. Onely they take great pride and delight, in the Feathers of Birds; And this also they tooke from those their Ancestours of the Mountaines, who were invited unto it, by the infinite Flights of Birds, that came up to the high Grounds, while the Waters stood below. So you see, by this maine Accident of Time, wee lost our Traffique with the Americans, with whom, of all others, in regard they lay nearest to us, wee had most Commerce. As for the other Parts of the World, it is most manifest, that in the Ages following, (whether it were in respect of Warres, or by a naturall Revolution of Time,) Navigation did every where greatly decay; And specially, farre Voyages, the rather by the Use of Gallies, and such Vessells as could hardly brooke the Ocean) were altogether left and emitted. So then, that Part of Entercourse, which could bee from other Nations, to Sayle to us; you see how it hath long since ceased; Except it were by some rare Accident, as this of yours. But now of the Cessation of that other Part of Entercourse, which mought bee by our Sayling to other Nations, I must yeeld you some other Cause. For I cannot say, (if I shall say truelie,) but our Shipping, for Number, Strength, Mariners, Pylots, and all things that appertaine to Navigation, is as great as ever; And therefore

therefore why we ſhould ſit at home, I ſhall now give you an account by it ſelfe; And it will draw nearer, to give you ſatisfaction, to your principall Queſtion.

There raigned in this Iſland, about 1900. *yeares agoe, a* King, *whoſe memory of all others we moſt adore; Not Superſtitiouſly, but as a Divine Inſtrument, though a Mortall Man: His Name was* Salomona: *And we eſteeme him as the* Law-giver *of our Nation. This* King *had* a large heart, *inſcrutable for good; and was wholly bent to make his Kingdome and People Happy. He therefore taking into Conſideration, how ſufficient and ſubſtantive this Land was, to maintain it ſelfe without any ayd (at all) of the Forrainer; Being* 5600. *Mile in Circuit, and of rare Fertility of Soyle, in the greateſt part thereof; And finding alſo the Shipping of this Countrey mought bee plentifully ſet on worke, both by Fiſhing, and by Tranſportations from Port to Port, and likewiſe by Sayling unto ſome ſmall Iſlands that are not farre from us, and are under the Crowne and Lawes of this* State; *And recalling into his Memory, the happy and flouriſhing Eſtate, wherein this Land then was; So as it mought be a thouſand wayes altered to the worſe, but ſcarce any one way to the better; thought nothing wanted to his Noble and Heroicall Intentions, but onely (as farre as Humane foreſight mought reach) to give perpetuity to that, which was in his time ſo happily eſtabliſhed. Therefore amongſt his other Fundamentall Lawes of this Kingdome, he did ordaine, the Interdicts and Prohibitions, which wee have touching Entrance of Strangers; which at that time (though it was after the Calamity of* America) *was frequent; Doubting Novelties, and Commixture of Manners. It is true, the like Law, againſt the Admiſſion of Strangers without Licenſe, is an ancient Law, in the Kingdome of* China, *and yet continued in uſe. But there it is a poor Thing; And hath made them a curious, ignorant, fearefull, fooliſh Nation. But our* Law-giver *made his Law of another temper. For firſt, he hath preſerved all points of Humanity, in taking Order, and making Proviſion for the Reliefe of Strangers diſtreſſed; whereof you have taſted.* At which Speech (as reaſon was) wee all roſe up, and bowed our ſelves. He went on. *That* King *alſo ſtill deſiring to joyne Humanity and Policy together; And thinking it againſt Humanity, to detaine Strangers here againſt their wills; And againſt Policy, that they ſhould returne, and diſcover their knowledge of this Eſtate, He tooke this Courſe: Hee did ordaine, that of the Strangers, that ſhould be permitted to Land, as many (at all times) mought depart as many as would; But as many as would ſtay, ſhould have very good Conditions, and Meanes to live,*

from the State. *Wherein he saw so farre, that now in so many Ages since the Prohibition, we, have memory, not of one Ship that ever returned, and but of thirteen Persons onely, at severall times, that chose to returne in our Bottomes. What those few that returned, may have reported abroad, I know not. But you must thinke, Whatsoever they have said, could be taken where they came, but for a Dreame. Now for our Travelling from hence into Parts abroad, our* Law-giver *thought fit, altogether to restraine it. So is it not in* China. *For the* Chineses *sayle where they will, or can; which sheweth, that their Law of Keeping out Strangers, is a Law of Pusillanimity, and feare. But this restraint of ours, hath one onely Exception, which is admirable; Preserving the good which commeth by communicating with Strangers, and avoiding the Hurt; And I will now open it to you. And here I shall seeme a little to digresse, but you will by and by finde it pertinent. Ye shall understand, (my deare Friends,) that amongst the Excellent Acts of that* King, *one above all hath the preheminence. It was the Erection, and Institution of an* Order, *or* Societie, *which we call* Salomons House; *The Noblest Foundation, (as wee thinke,) that ever was upon the Earth; And the Lanthorne of this Kingdome. It is dedicated to the Study of the* Workes *and* Creatures *of* GOD. *Some thinke it beareth the Founders Name a little corrupted, as if it should be* Solamona's House. *But the Records write it, as it is spoken. So as I take it to be denominate of the* King *of the* Hebrewes, *which is famous with you, and no Stranger to us; For wee have some Parts of his Workes, which with you are lost; Namely that* Naturall History, *which he wrote of all* Plants, *from the* Cedar of Libanus, *to the* Mosse that groweth out of the Wall; *And of all* things that have Life and Motion. *This maketh me thinke, that our* King *finding himselfe to Symbolize, in many things, with that* King *of the* Hebrewes *(which lived many yeares before him) honoured him with the Title of this Foundation. And I am the rather induced to be of this Opinion, for that I finde in ancient Records, this* Order *or* Society *is sometimes called* Salomons House; *And sometimes the* Colledge *of the* Sixe Dayes Workes; *whereby I am satisfied, That our Excellent* King *had learned from the* Hebrewes, *That* GOD *had created the World, and all that therein is, within sixe* Dayes; *And therefore he instituting that* House, *for the finding out of the true Nature of all Things (whereby* GOD *mought have the more Glory in the Workmanship of them, and Men the More fruit in the Use of them) did give it also that second Name. But now to come to our present purpose. When the* King *had forbidden, to all his People, Navi-*

gation

gation into any Part, that was not under his Crowne, hee made nevertheleſſe this Ordinance; That every twelve yeares there ſhould be ſet forth, out of this Kingdome, *two Ships, appointed to ſeverall Voyages; That in either of theſe Ships, there ſhould be a Miſſion of three of the* Fellowes, *or* Brethren *of* Salomons Houſe; *whoſe Errand was onely to give us Knowledge of the Affaires and State of thoſe Countries, to which they were deſigned; And eſpecially of the Sciences, Arts, Manufactures, and Inventions of all the World; And withall to bring unto us, Bookes, Inſtruments, and Patternes, in every kinde: That the Shippes, after they had landed the* Brethren, *ſhould returne; And that the* Brethren *ſhould ſtay abroad till the new Miſſion, The Ships are not otherwiſe fraught, than with Store of Victuals, and good Quantity of Treaſure to remaine with the* Brethren, *for the buying of ſuch Things, and rewarding of ſuch Perſons, as they ſhould thinke fit. Now for me to tell you, how the Vulgar ſort of Marriners are contained from being diſcovered at Land; And how they that muſt be put on ſhore for any time, colour themſelves under the Names of other Nations; And to what places theſe Voyages have beene deſigned; And what places of* Rendezvous *are appointed for the new Miſſions; And the like circumſtances of the Practique; I may not doe it; Neither is it much to your deſire. But thus you ſee, we maintaine a Trade, not for Gold, Silver, or Jewels; Nor for Silks; Nor for Spices; Nor any other Commodity of Matter; But onely for* Gods *firſt Creature, which was* Light: *To have* Light *(I ſay) of the Growth of all Parts of the World.* And when hee had ſaid this, he was ſilent; And ſo were we all. For indeed we were all aſtoniſhed, to heare ſo ſtrange things ſo probably told. And he perceiving that we were willing to ſay ſomewhat, but had it not ready, in great Courteſie tooke us off, and deſcended to aske us Queſtions of our Voyage and Fortunes, and in the end concluded, that we mought doe well, to thinke with our ſelves, what time of ſtay we would demand of the State; And bade us not to ſcant our ſelves; For he would procure ſuch time as we deſired. Whereupon we all roſe up and preſented our ſelves to kiſſe the skirt of his Tippet, but he would not ſuffer us; and ſo tooke his leave. But when it came once amongſt our People, that the State uſed to offer Conditions to Strangers, that would ſtay, we had worke enough to get any of our Men to looke to our Ship; And to keep them from going preſently to the Governour, to crave conditions. But with much adoe wee refrained them, till we mought agree what courſe to take.

We

We tooke our ſelves now for free men, ſeeing there was no danger of our utter Perdition; And lived moſt joyfully, going abroad, and ſeeing what was to bee ſeene, in the Citie and places adjacent, within our *Tedder*; And obtaining acquaintance with many of the Citie, not of the meaneſt Qualitie; At whoſe hands we found ſuch Humanitie, and ſuch a freedome and deſire to take Strangers, as it were, into their Boſome, as was enough to make us forget all that was deare to us, in our owne Countries: And continually we met with many things, right worthy of Obſervation, and Relation: As indeed, if there bee a Mirrour in the World, worthy to hold Mens Eyes, it is that Countrey. One day there were two of our Company bidden to a *Feaſt* of the *Family*, as they call it. A moſt Naturall, Pious, and Reverend Cuſtome it is, ſhewing that Nation to be compounded of all Goodneſſe. This is the manner of it. It is granted to any Man, that ſhal live to ſee thirty Perſons, deſcended of his Body, alive together, and all above three yeares old, to make this *Feaſt*, which is done at the coſt of the State. The *Father* of the *Family*, whom they call the *Tirſan*, two dayes before the *Feaſt*, taketh to him three of ſuch Friends as he liketh to chuſe. And is aſſiſted alſo by the Governour of the Citie, or Place, where the *Feaſt is* celebrated; And all the *Perſons* of the *Family*, of both Sexes, are ſummoned to attend him. Theſe two dayes the *Tirſan* ſitteth in Conſultation, concerning the good Eſtate of the *Family*. There, if there be any Diſcord or Sutes betweene any of the *Family*, they are compounded and appeaſed. There, if any of the Family be diſtreſſed or decayed, order is taken for their Reliefe, and competent meanes to live. There, if any bee ſubject to vice, or take ill Courſes, they are reproved, and Cenſured. So likewiſe, Direction is given touching Marriages, and the courſes of life, which any of them ſhould take, with divers other the like Orders and Adviſes. The Governour aſſiſteth, to the end, to put in Execution, by his Publike Authority, the Decrees and Orders of the *Tirſan*, if they ſhould be diſobeyed; Though that ſeldome needeth; Such Reverence and Obedience they give, to the Order of Nature. The *Tirſan* doth alſo then, ever chuſe one Man from amongſt his Sonnes, to live in Houſe with him: Who is called, ever after, the *Sonne of the Vine*. The Reaſon will hereafter appeare. On the *Feaſt* day, the *Father*, or *Tirſan* commeth forth after Divine Service, into a large Roome, where the *Feaſt* is celebrated; Which Roome hath an Halfe-

Pace

Pace at the upper end. Against the wall, in the middle of the Half-Pace, is a Chaire placed for him, with a Table and Carpet before it. Over the Chaire is a State, made Round or Ovall, and it is of Ivy; An Ivy somewhat whiter than ours, like the Leafe of a Silver Aspe, but more shining; For it is greene all winter. And the State is curiously wrought with Silver and Silke of divers Colours, broiding or binding in the Ivy; And is ever of the worke, of some of the Daughters of the Family; And vailed over at the Top, with a fine Net of Silk and Silver. But the Substance of it is true Ivy; whereof, after it is taken downe, the Friends of the Family are desirous to have some Leafe or Sprig to keep. The *Tirsan* commeth forth with all his Generation or Linage, the Males before him, and the Females following him; And if there bee a Mother, from whose Body the Whole Linage is descended, there is a Traverse placed in a Loft above on the right hand of the Chaire, with a privy Dore, and a carved Window of Glasse, leaded with Gold and Blew; Where she sitteth, but is not seene. When the *Tirsan* is come forth, he sitteth downe in the Chaire; And all the Linage place themselves against the Wall, both at his Backe, and upon the Returne of the Halfe-pace, in Order of their yeares, without difference of Sex, and stand upon their Feet. When he is set, the Roome being alwayes full of Company; but well kept, and without Disorder; after some pause there commeth in from the lower end of the Roome, a *Taratan*, (which is as much as an *Herald*,) And on either side of him two *young Lads*; Whereof one carrieth a Scrowle of their shining yellow Parchment; And the other a cluster of Grapes of Gold, with a long Foot or Stalke. The *Herald*, and *Children*, are clothed with Mantles of Sea-water greene Sattin; But the *Heralds* Mantle is streamed with Gold, and hath a Traine. Then the *Herald* with three Curtesies, or rather Inclinations, commeth up as farre as the Halfe-pace; And there first taketh into his Hand the Scrowle. This Scrowle is the *Kings Charter*, containing Gift of Revenew, and many Privileges, Exemptions, and Points of Honour, granted to the *Father* of the *Family*; And it is ever stiled and directed; *To such an one, Our welbeloved Friend and Creditour:* Which is a Title proper onely to this Case. For they say, the King is Debter to no Man, but for Propagation of his Subjects, The Seale set to the *Kings Charter*, is the Kings Image, Imbossed or moulded in Gold; And though such *Charters* be expedited of Course, and

as

as of Right, yet they are varied by discretion, according to the Number and Dignitie of the *Family*. This *Charter* the *Herald* readeth aloud; And while it is read, the *Father* or *Tirsan*, standeth up, supported by two of his Sonnes; such as he chooseth. Then the *Herald* mounteth the Halfe-Pace, and delivereth the *Charter* into his Hand: And with that there is an Acclamation, by all that are present, in their Language, which is thus much; *Happy are the People of Bensalem.* Then the *Herald* taketh into his Hand from the other Childe, the Cluster of Grapes, which is of Gold; Both the Stalke, and the Grapes. But the Grapes are daintily enamelled; And if the Males of the *Family* be the greater number, the Grapes are enamelled Purple, with a little Sunne set on the Top; If the Females, then they are enamelled into a greenish yellow, with a Cressant on the Top. The Grapes are in number as many as there are Descendants of the *Family*. This Golden Cluster, the *Herald* delivereth also to the *Tirsan*; who presently delivereth it over, to that Sonne, that he had formerly chosen, to be in House with him: Who beareth it before his *Father*, as an Ensigne of Honour, when he goeth in publike ever after; And is thereupon called *the Sonne of the Vine*. After this Ceremony ended, the *Father* or *Tirsan* retireth; And after some time commeth forth againe to Dinner, where hee sitteth alone under the State, as before; And none of his Descendants sit with him, of what Degree or Dignity so ever, except he hap to be of *Salomons House*. He is served onely by his owne Children, such as are Male; who performe unto him all service of the Table upon the knee; And the Women onely stand about him, leaning against the wall. The Roome below his Halfe-pace, hath Tables on the sides for the Guests that are bidden; Who are served with great and comely order; And towards the end of Dinner (which in the greatest Feasts with them, lasteth never above an Houre and a half) there is an *Hymne* sung, varied according to the Invention of him that composeth it; (for they have excellent Poesie,) But the Subject of it is (alwayes) the praises of *Adam*, and *Noah*, and *Abraham*; Whereof the former two Peopled the World, and the last was the *Father* of the *Faithfull*: concluding ever with a Thanksgiving for the *Nativity* of our *Saviour*, in whose Birth, the Births of all are onely Blessed. Dinner being done, the *Tirsan* retireth againe; And having withdrawne himselfe alone into a place; where he maketh some private Prayers, he commeth forth the third time, to give the Blessing;

ſing; with all his Deſcendants, who ſtand about him as at the firſt. Then he calleth them forth by one and by one, by name, as he pleaſeth, though ſeldome the Order of Age bee inverted. The perſon that is called, (the Table being before removed,) kneeleth down before the Chair, and the *Father* layeth his Hand upon his Head, or her Head, and giveth the Bleſſing in theſe words; *Sonne of Benſalem, (or Daughter of Benſalem,) thy Father ſaith it; The Man by whom thou haſt Breath and Life ſpeaketh the word; The Bleſſing of the Everlaſting Father, the Prince of Peace, and the Holy Dove be upon thee, and make the dayes of thy Pilgrimage good and many.* This he ſaith to every of them; And that done, if there be any of his Sonnes, of eminent Merit and Vertue, (ſo they be not above two,) he calleth for them againe; and ſaith, laying his Arme over their ſhoulders, they ſtanding; *Sonnes, it is well you are borne, give God the praiſe, and perſevere to the end.* And withall delivereth to either of them a Jewell, made in the Figure of an Eare of Wheate, which they ever after weare in the front of their Turban, or Hatt. This done, they fall to Muſicke and dances, and other recreations, after their manner, for the reſt of the day. This is the full order of that Feaſt.

By that time, ſix or ſeven Dayes were ſpent, I was fallen into ſtraight Acquaintance, with a *Merchant* of that *Citie*, whoſe Name was *Joabin*. He was a *Iew* and *Circumciſed*: For they have ſome few ſtirps of *Iewes*, yet remaining among them, whom they leave to their owne Religion. Which they may the better doe, becauſe they are of a farre differing Diſpoſition from the *Iewes* in other Parts. For whereas they hate the Name of CHRIST; and have a ſecret inbred Rancour againſt the People amongſt whom they live; theſe (contrariwiſe) give unto our SAVIOUR many high Attributes, and love the *Nation* of *Benſalem*, extremely. Surely this Man, of whom I ſpeake, would ever acknowledge, that CHRIST was borne of a *Virgin*; and that he was more than a Man; And he would tell how GOD made him Ruler of the *Seraphims*, which guard his Throne; And they call him alſo the *Milken Way*, and the *Eliah* of the *Meſſiah*; and many other High Names; which though they be Inferiour to his Divine Majeſty, yet they are farre from the Language of other *Jewes*. And for the Countrey of *Benſalem*, this Man would make no end of commending it, Being deſirous by Tradition among the *Iews* there, to have it beleeved, that the Peo-

ple thereof were of the Generations of *Abraham*, by another Sonne, whom they call *Nachoran*; And that *Moses* by a secret *Cabala* ordained the Lawes of *Bensalem* which they now use; And that when the *Messias* should come, and sit in his Throne at *Hierusalem*, the King of *Bensalem*, should sit at his feet, whereas other Kings should keepe a great distance. But yet setting aside these *Iewish* Dreames, the Man was a wise Man, and learned, and of great Policy, and excellently seene in the Lawes and Customes of that Nation. Amongst other Discourses, one day, I told him, I was much affected with the Relation I had, from some of the Company, of their Custome, in holding the *Feast* of the *Family*; For that (me thought) I had never heard of a Solemnity, wherein Nature did so much preside. And because Propagation of Families, proceedeth from the Nuptiall Copulation, I desired to know of him, what Lawes and Customes they had concerning Marriage; and whether they kept Marriage well; and whether they were tyed to one Wife? For that where Population is so much affected, and such as with them it seemed to bee, there is commonly Permission of *Plurality* of *Wives*. To this he said; *You have Reason for to commend that excellent Institution of the* Feast *of the* Family; *And indeed we have Experience, that those Families that are partakers of the Blessings of that Feast, doe flourish and prosper ever after, in an extraordinary manner. But hear me now, and I will tell you what I know. You shall understand, that there is not under the Heavens so chaste a Nation, as this of Bensalem; Nor so free from all Pollution or foulenesse. It is the Virgin of the World, I remember, I have reade in one of your* Europæan *Bookes, of an holy Hermit amongst you, that desired to see the* Spirit *of* Fornication, *and there appeared to him, a little foule ugly* Aethiope: *But if hee had desired to see the* Spirit *of* Chastitie *of* Bensalem, *it would have appeared to him, in the likenesse of a faire beautifull* Cherubine. *For there is nothing, amongst Mortall Men, more faire and admirable, than the Chaste Mindes of this People. Know therefore, that with them there are no Stewes, no dissolute Houses, no Curtisans, nor any thing of that kinde. Nay they wonder (with detestation) at you in* Europe, *which permit such things. They say ye have put Marriage out of office: For Marriage is ordained a Remedie for unlawfull Concupiscence; And Naturall Concupiscence seemeth as a spurre to Marriage. But when Men have at hand a Remedy, more agreeable to their corrupt will, Marriage is almost expulsed. And therefore there are with you seene*

infinite

infinite Men, that marry not, but chuſe rather a libertine and impure ſingle Life, than to bee yoaked in Marriage; And many that doe marry, marry late, when the Prime and Strength of their Yeares is paſt. And when they doe marry, what is Marriage to them, but a very Bargaine; Wherein is ſought Alliance, or Portion, or Reputation, with ſome deſire (almoſt indifferent) of Iſſue; And not the faithfull Nuptiall Vnion of Man and Wife, that was firſt inſtituted. Neither is it poſſible, that thoſe that have caſt away ſo baſely, ſo much of their Strength, ſhould greatly eſteeme Children, (being of the ſame Matter,) as chaſte Men doe. So likewiſe during Marriage is the Caſe much amended, as it ought to be if thoſe things were tolerated onely for neceſſitie; No, but they remaine ſtill as a very Affront to Marriage. The Haunting of thoſe diſſolute places, or reſort to Curtezans, are no more puniſhed in Married Men, than in Batchelers. And the depraved Cuſtome of Change, and the delight in Meretricious Embracements, (where ſinne is turned into Art,) maketh marriage a dull thing, and a kinde of Impoſition, or Taxe. They heare you defend theſe things; as done to avoid greater Evills; As Advoutries, Deflouring of Virgins, Vnnaturall luſt, and the like. But they ſay, this is a prepoſterous Wiſdome; And they call it Lots offer, *who to ſave his Gueſts from abuſing, Offered his Daughters: Nay they ſay further, That there is little gained in this; For that the ſame Vices and Appetites, doe ſtill remaine and abound; Unlawfull Luſt being like a Furnace, that if you ſtop the Flames altogether, it will quench; But if you give it any vent, it will rage; As for Maſculine Love, they have no touch of it; And yet there are not, ſo faithfull and inviolate Friendſhips, in the world againe, as are there; And to ſpeake generally, (as I ſaid before,) I have not read of any ſuch Chaſtitie, in any People, as theirs. And their uſuall ſaying is,* That whoſoever is unchaſte cannot reverence himſelfe: *And they ſay,* That the reverence of a Mans ſelfe, is, next Religion, the chiefeſt bridle of all Vices. And when he had ſaid this, the good *Iew* pauſed a little; Whereupon, I farre more willing to heare him ſpeake on, than to ſpeake my ſelfe; yet thinking it decent, that upon his pawſe of Speech, I ſhould not be altogether ſilent, ſaid onely this; *That I would ſay to him, as the* Widow *of* Sarepta *ſaid to* Elias; *That hee was come to bring to Memorie our Sinnes; And that I confeſſe the* Righteouſneſſe *of* Benſalem, *was greater than the* Righteouſneſſe *of* Europe. At which ſpeech he bowed his Head, and went on this manner. *They have alſo many wiſe and excellent Lawes touching* Marriage.

They allow no Polygamie. *They have ordained that none doe intermarry, or contract, untill a Moneth be past from their first inter-view.* Marriage *without consent of Parents they doe not make void, but they mulct it in the Inheritors: For the Children of such* Marriages, *are not admitted to inherit, above a third Part of their Parents Inheritance. I have read in a* Book *of one of your* Men, *of a* Feigned Common-wealth, *where the Married couple are permitted, before they Contract, to see one another Naked. This they dislike: For they think it a Scorne, to give a Refusall after so familiar Knowledge: But because of many hidden Defects in Men and Womens Bodies, they have a more Civill way: for they have neare every Towne, a Couple of* Pooles, *(which they call* Adam *and* Eves Pooles,) *where it is permitted to one of the friends of the Man, & another of the friends of the Woman, to see them severally bath Naked.*

And as wee were thus in Conference, there came one that seemed to bee a Messenger, in a rich Huke, that spake with the *Jew*: whereupon he turned to me, and said; *You will pardon me, for I am commanded away in haste.* The next Morning hee came to me againe, joyfull, as it seemed, and said; *There is word come to the Governour of the Citie, that one of the* Fathers *of* Salomons House, *will be here this day Seven-night: Wee have seene none of them this Dozen Yeares. His Comming is in State; But the cause of his Comming is secret. I will provide you, and your* Fellowes, *of a good Standing to see his Entry.* I thanked him, and told him; *I was most glad of the Newes.* The day being come he made his Entry. He was a *Man* of middle Stature, and Age, comely of Person, and had an Aspect as if he pittied Men. He was cloathed in a Roabe of fine blacke Cloth, with wide Sleeves, and a Cape. His under Garment was of excellent white Linnen, downe to the Foot, girt with a girdle of the same; And a Sindon or Tippet of the same about his Neck. Hee had Gloves, that were curious, and set with Stone; And Shoes of Peach-coloured Velvet. His Necke was bare to the Shoulders. His Hat was like a Helmet, or *Spanish Montera*; And his locks curled below it decently: They were of Colour browne. His Beard was cut round, and of the same colour with his Haire, somewhat lighter. Hee was caried in a rich Charriot, without wheeles, Litter-wise, With two Horses at either end, richly trapped in blew Velvet Embroydered; and two Footmen on each side in the like Attire. The Charriot was all of Cedar, gilt and adorned with Chrystall; Save that the Fore-end had

Pannels

Pannells of Sapphires, set in Borders of Gold, and the Hinder-end the like of Emerauds of the *Peru* Colour. There was also a Sunne of Gold, Radiant upon the Top, in the Midst; And on the Top before, a small *Cherub* of Gold, with Wings display ed. The Charriot was covered with Cloth of Gold tissued upon Blew. He had before him fifty Attendants, young Men all, in white *Satten* loose Coats to the Mid Leg, and Stockings of white Silk; and Shoos of blew Velvet; and Hats of blew Velvet; with fine Plumes of divers Colours, set round like Hat-bands. Next before the Chariot, went two Men, bare headed, in Linnen Garments downe to the foot, girt, and Shoes of blew Velvet, who carried the one a Crosier, the other a Pastorall Staffe, like a Sheep-hooke; Neither of them of Metall, but the Crosier of Balme-wood, the Pastorall Staffe of Cedar. Horse-Men hee had none, neither before, nor behind his Charriot: As it seemeth, to avoid all Tumult and Trouble. Behinde his Chariot, went all the Officers and Principals of the Companies of the Citie. He sate alone, upon Cushions, of a kinde of excellent Plush, blew; And under his Foot curious Carpets of Silke of divers Colours, like the Persian, but farre finer. He held up his Bare Hand, as he went, as blessing the people, but in Silence. The Street was wonderfully well kept; So that there was never any Army had their Men stand in better Battell-Array, than the People stood. The Windowes likewise were not crouded, but every One stood in them, as if they had beene placed. When the shew was past, the *Jew* said to mee; *I shall not be able to attend you as I would, in regard of some Charge the Citie hath layd upon me, for the Entertaining of this Great Person.* Three dayes after the *Jew* came to me againe, and said; *Ye are happy Men; For the* Father *of* Salomons House *taketh knowledge of your Being here, and commanded me to tell you, that he will admit all your Company to his presence, and have private Conference with one of you, that yee shall choose: And for this hath appointed the next day after to Morrow. And because he meaneth to give you his Blessing, hee hath appointed it in the Fore-Noone.* Wee came at our Day, and Houre, and I was chosen by my Fellowes for the private Accesse. We found him in a faire Chamber, richly hanged, and carpetted under Foot, without any Degrees to the State, he was set upon a Low Throne richly adorned, and a rich cloth of State over his Head, of Blew Sattin Embroidered. He was alone, save that hee had two Pages of Honour, on either Hand one, finely attired in White.

White. His Under Garments were the like that wee saw him weare in the Chariot; But in stead of his Gowne, he had on him a Mantle with a Cape, of the same fine Blacke, fastned about him. When wee came in, as we were taught, we bowed Low at our first Entrance; And when wee were come neare his Chaire, he stood up, holding forth his Hand ungloved, and in Posture of Blessing; And we every one of us stooped downe, and kissed the Hemme of his Tippet. That done, the rest departed, and I remained. Then he warned the Pages forth of the Roome, and caused me to sit downe beside him, and spake to me thus in the *Spanish Tongue*.

GOD *blesse thee, my Sonne; I will give thee the greatest Jewell I have. For I will impart unto thee, for the love of GOD and Men, a Relation of the true State of* Salomons House. *Sonne, to make you know the true state of* Salomons House, *I will keepe this order. First I will set forth unto you the* End *of our* Foundation. *Secondly, the* Preparations *and* Instruments *we have for our* VVorks. *Thirdly, the severall* Employments *and* Functions *whereto our* Fellowes *are assigned. And fourthly the* Ordinances *and* Rites *which wee observe.*

The End *of our* Foundation *is the Knowledge of* Causes, *and Secret Motions of Things; and the Enlarging of the bounds of* Humane Empire, *to the Effecting of all Things possible.*

The Preparations *and* Instruments *are these. We have large and deep* Caves *of several Depths: The deepest are sunke* 600. *Fathome: And some of them are digged and made under great Hills and Mountaines: So that if you reckon together the*

Depth

Depth of the Hill, and the Depth of the Cave, *they are (some of them) above three Miles deep. For we finde, that the Depth of an Hill, and the Depth of a* Cave *from the Flat, is the same Thing; both remote alike, from the Sunne and Heavens Beames, and from the open Aire. These* Caves *we call the* Lower Region. *And wee use them for all* Coagulations, Indurations, Refrigerations, *and* Conservations, *of* Bodies. *We use them likewise for the* Imitation *of* Naturall Mines; *And the* Producing *also of* New Artificiall Mettals, *by* Compositions *and* Materials *which we use & lay there for many yeares. We use them also sometimes, (which may seeme strange) for* Curing *of some* Diseases, *and for* Prolongation *of* Life, *in some* Hermits *that choose to live there, well accommodated of all things necessary, and indeed live very long; By whom also we learne many things.*

We have Burialls *in severall* Earths, *where we put divers* Cements, *as the* Chineses, *doe their* Porcellane. *But we have them in greater Varietie, and some of them more fine. We also have great variety of* Composts, *and* Soiles, *for the Making of the Earth Fruitfull.*

We have High Towers; *The Highest about halfe a Mile in Height; And some of them likewise set upon High* Mountaines; *So that the Vantage of the Hill with the* Tower, *is in the Highest of them three Miles at least. And these Places we call the* Vpper Region; *Accounting the Aire betweene the* High Places, *and the* Low, *as a* Middle Region. *We use these* Towers, *according to their severall Heights, and Situations, for* Insolation,

tion, Refrigeration, Conservation, *And for the* View *of divers* Meteors; *As* VVindes, Raine, Snow, Haile; *And some of the* Fiery Meteors *also. And upon them, in some Places, are Dwellings of* Hermits, *whom we visit sometimes, and instruct what to observe.*

We have great Lakes *both* Salt, *and* Fresh, *whereof we have use for the* Fish, *and* Fowle. *We use them also for* Burialls *of some* Naturall Bodies: *For wee finde a difference in Things buried in* Earth, *or in* Aire *below the* Earth; *and things buried in* VVater. *We have also* Pooles, *of which some doe straine* Fresh VVater *out of* Salt; *And others by Art doe turne* Fresh VVater *into* Salt. *We have also some* Rocks *in the Midst of the* Sea; *And some* Bayes *upon the* Shore *for some* Works, *wherein is required the* Aire *and* Vapour *of the* Sea. *We have likewise* violent Streames *and* Cataracts, *which serve us for many* Motions: *And likewise* Engines *for* Multiplying *and* Enforcing *of* Windes, *to set also on going divers* Motions.

We have also a Number of Artificiall Wells, *and* Fountaines, *made in Imitation of the* Naturall Sources *and* Bathes; *As tincted upon* Vitrioll, Sulphur, Steele, Brasse, Lead, Nitre, *and other* Mineralls: *And againe, wee have little* Wells *for* Infusions *of many* Things, *where the* Waters *take the Vertue quicker and better, than in* Vessels, *or* Basins. *And amongst them we have a* Water, *which we call* vvater *of* Paradise, *being, by that we doe to it, made very Soveraigne for* Health, *and* Prolongation *of* Life.

VVe

We have also Great *and spacious* Houses, *where we imitate and demonstrate* Meteors; *As* Snow, Haile, Raine, *some* Artificiall Raines *of* Bodies, *and not of* Water, Thunders, Lightnings; *Also* Generations *of* Bodies *in* Aire; *As* Frogs, Flies, *and diverse Others.*

We have also certaine Chambers, *which we call* Chambers *of* Health, *where we qualifie the* Aire *as we thinke good and proper for the* Cure *of divers* Diseases, *and* Preservation *of* Health.

We have also faire and large Baths, *of severall* Mixtures, *for the* Cure *of* Diseases, *and the* Restoring *of* Mans Body *from* Arefaction: *And Others for the* Confirming *of it in* Strength *of* Sinews, Vitall Parts, *and the very* Juyce *and* Substance *of the* Body.

We have also large and various Orchards, *and* Gardens; *Wherein we do not so much respect Beauty, as Variety of Ground and Soile, proper for divers* Trees, *and* Herbes: *And some very spacious, where* Trees *and* Berries *are set, whereof we make divers Kindes of* Drinks, *besides the* Vine-yards. *In these we practise likewise all Conclusions of* Grafting, *and* Inoculating, *as well of* Wilde-Trees, *as* Fruit-Trees, *which produceth many Effects. And we make (by Art) in the same* Orchards, *and* Gardens, Trees *and* Flowers, *to come earlier or later than their* Seasons; *And to come up and beare more speedily than by their* Naturall Course *they doe. Wee make them also by* Art *greater much than their* Nature; *And their* Fruit *greater, and sweeter, and of differing* Taste, Smell, Colour, *and* Figure, *from their* Nature. *And many of them we so*

Order as that they become of Medicinall Use.

We have also Meanes to make divers Plants, rise by Mixtures of Earths without Seeds; And likewise to make divers New Plants, differing from the Vulgar; and to make one Tree or Plant turne into another.

We have also Parkes, and Enclosures of all Sorts, of Beasts, and Birds; which we use not onely for View or Rareness, but likewise for Dissections, and Trials; That thereby may take light, what may be wrought upon the Body of Man. Wherein wee finde many strange Effects; As Continuing Life in them, though divers Parts, which you account Vitall, be perished, and taken forth; Resuscitating of some that seeme Dead in Appearance; And the like. We try also all Poysons, and other Medicines upon them, as well of Chirurgery, as Physicke. By Art likewise, we make them Greater, or Taller, than their Kinde is; And contrary-wise Dwarfe them and stay their Growth: Wee make them more Fruitfull, and Bearing than their Kinde is; And contrary-wise Barren and not Generative. Also we make them differ in Colour, Shape, Activity, many wayes. We finde Meanes to make Commixtures & Copulations of diverse Kindes; which have produced many New Kinds, and them not Barren, as the generall Opinion is. We make a number of Kindes, of Serpents, Wormes, Flies, Fishes, of Putrefaction; whereof some are advanced (in effect) to be Perfect Creatures, like Beasts, or Birds; And have Sexes, and doe Propagate. Neither do we this by Chance, but we know before hand, of what Matter and Commixture,

what

what Kinde of those Creatures, will arise.

We have also Particular Pools, where we make Trialls upon Fishes, as wee have said before of Beasts and Birds.

We have also Places for Breed and Generation of those Kindes of Wormes, and Flies, which are of Speciall Use; such as are with you your Silk-wormes, and Bees.

I will not hold you long with recounting of our Brew-houses, Bake-houses, and Kitchins, where are made divers Drinkes, Breads, and Meats, Rare and of speciall Effects. Wines wee have of Grapes; And Drinkes of other Juyce, of Fruits, of Graines, and of Rootes; And of Mixtures with Honey, Sugar, Manna, and Fruits dryed and decocted: Also of the Teares or Woundings of Trees; And of the Pulp of Canes. And these Drinks are of Severall Ages, some to the Age or Last of forty yeares. We have Drinks also brewed with severall Herbs, and Roots, and Spices; Yea, with severall Fleshes, and White-Meats; whereof some of the Drinkes are such as they are in effect Meat and Drinke both: So that Divers, especially in Age, doe desire to live with them, with little or no Meat, or Bread. And above all we strive to have Drinks of Extreame Thinne Parts; To insinuate into the Body, and yet without all Biting, Sharpnesse, or Fretting; Insomuch as some of them put upon the Back of your Hand, will, with a little stay passe thorow to the Palme. and yet taste Mild to the Mouth. We have also Waters, wch wee ripen in that fashion, as they become Nourishing; So that they are indeed excellent Drinke;

And many will use no other. Breads *we have of Severall* Graines, Roots, *and* Kernels; *Yea, and some of* Flesh, *and* Fish, Dried; *With divers kinds of* Leavings, *and* Seasonings: *So that some doe extreamely move* Appetites; *Some doe nourish so, as Divers doe live of them, without any other* Meat; *Who live very long. So for* Meats, *wee have some of them so* beaten, *and made* tender, *and* mortified, *yet without all* Corrupting, *as a* Weake Heat *of the* Stomacke *will turne them into good* Chilus; *As well as a* Strong Heat *would* Meat *otherwise prepared. We have some* Meats *also, and* Breads, *and* Drinkes, *which taken by Men, enable them to* Fast *long after; And some other, that used make the very* Flesh *of* Mens Bodies, *sensibly more* Hard *and* Tough; *And their* Strength *farre greater, than otherwise it would be.*

We have Dispensatories, *or* Shops *of* Medicines. *Wherein you may easily thinke, if we have such* Varietie *of* Plants, *and* Living Creatures, *more than you have in* Europe, (*for we know what you have,*) *the* Simples, Drugges, *and* Ingredients *of* Medicines, *must likewise be in so much the greater* Varietie. *We have them likewise of divers* Ages, *and long* Fermentations. *And for their* Preparations, *wee have not onely all Manner of Exquisite* Distillations, *and* Separations, *and especially by* Gentle Heats, *and* Percolations *through divers* Strainers, *yea, and* Substances; *But also exact* Formes *of* Composition, *whereby they incorporate almost as they were* Naturall Simples.

We have also divers Mechanicall Arts, *which*

you

you have not; And Stuffes *made by them; As* Papers, Linnen, Silkes, Tissues; *dainty* Workes *of* Feathers *of wonderfull Lustre; excellent* Dies, *and manie others: And* Shops, *likewise as well for such as are not brought into Vulgar use amongst us, as for those that are. For you must know, that of the Things before recited, manie of them are growne into use throughout the Kingdome; But yet, if they did flow from our* Invention, *we have of them also for* Patternes, *and* Principalls.

We have also Fournaces *of great* Diversities, *and that keepe great* Diversitie *of* Heats: Fierce *and* Quicke; Strong *and* Constant; Soft *and* Milde; Blowne, Quiet, Drie, Moist; *And the like. But above all we have* Heats, *in Imitation of the* Sunnes *and* Heavenly Bodies Heats, *that passe divers* Inequalities, *and (as it were)* Orbs, Progresses, *and* Returnes, *whereby wee produce admirable effects. Besides, wee have* Heats *of* Dungs; *and of* Bellies *and* Mawes *of* Living Creatures *and of their* Bloods, *and* Bodies; *and of* Hayes *and* Herbs *laid up moist; of* Lime *unquenched; and such like.* Instruments *also which generate* Heate *onely by* Motion. *And further,* Places *for Strong* Insolations; *And againe,* Places *under the* Earth, *which by* Nature, *or* Art, *yeeld* Heate. *These divers* Heats *wee use, As the* Nature *of the* Operation, *which wee intend, requireth.*

VVee have also Perspective-Houses, *where we make* Demonstrations *of all* Lights, *and* Radiations: *And of all* Colours: *And out of* Things uncoloured *and* Transparent, *we can represent unto*

to you all severall Colours; *Not in* Rain-bowes, (*as it is in* Gemmes, *and* Prismes,) *but of themselves Single. We represent also all* Multiplications *of* Light, *which we carry to great* Distance: *and make so* Sharpe, *as to discerne small* Points *and* Lines. *Also all* Colourations *of* Light. *All* Delusions *and* Deceits *of the* Sight, *in* Figures, Magnitudes, Motions, Colours: *All* Demonstrations *of* Shadowes. *Wee finde also divers Meanes yet unknowne to you, of* Producing *of* Light, *originally, from divers* Bodies. *We procure meanes of Seeing* Objects A-farre off; *As in the* Heaven, *and* Remote Places: *And represent* Things Neare *as* A-farre off; *And* Things A-farre off *as* Neare; *Making* Faigned Distances. *Wee have also* Helpes *for the* Sight, *farre above* Spectacles *and* Glasses *in use. Wee have also* Glasses *and* Means, *to see* Small *and* Minute Bodies, *perfectly and distinctly; As the* Shapes *and* Colours *of* Small Flies *and* Wormes, Graines, *and* Flawes, *in* Gemmes, *which cannot otherwise be seene,* Observations *in* Vrine *and* Bloud *not otherwise to be seene. We make* Artificiall Rain-Bowes, Halo's, *and* Circles *about* Light. *We represent also all manner of* Reflexions, Refractions, *and* Multiplications *of* Visuall Beames *of* Objects.

We have also Pretious Stones, *of all kindes, many of them of great Beautie and to you unknown:* Christalls *likewise; And* Glasses *of divers kinds; And amongst them some of* Metals Vitrificated, *and other* Materialls, *besides those of which you make* Glasse. *Also a Number of* Fossiles, *and* Imperfect

perfect Mineralls, *which you have not. Likewise* Loadstones *of Prodigious Vertue: And other rare* Stones, *both* Naturall *and* Artificiall.

Wee have also Sound-houses, *where we practise and demonstrate all* Sounds, *and their* Generation. *We have* Harmonies *which you have not, of* Quarter-Sounds, *and lesser* Slides *of* Sounds. *Diverse* Instruments *of* Musicke *likewise to you unknowne, some* sweeter *than any you have; Together with* Bells *and* Rings *that are dainty and sweet. Wee represent* small sounds *as* great *and* Deepe, *Likewise* Great sounds, Extenuate *and* sharpe; *We make diverse* tremblings *and* Warblings *of* sounds, *which in their* Originall *are* Entire. *We represent and imitate all* Articulate sounds *and* Letters, *and the* Voices *and* Notes *of* Beasts *and* Birds. *We have certaine* Helps, *which set to the* Eare *doe further the* Hearing *greatly. VVee have also diverse* strange *and* Artificiall Echo's, Reflecting *the* Voice *many times, and as it were* tossing *it: And some that give backe the* Voice Lowder *than it came, some* shriller, *and some* Deeper; *Yea some rendring the* Voice, Differing *in the* Letters *or* Articulate Sound, *from that they receive. VVe have also meanes to convey* sounds *in* Trunks *and* Pipes, *in strange* Lines *and* Distances.

Wee haue also Perfume-houses; *wherewith we joyne also* Practises *of* Taste. *VVe* Multiply smells, *which may seeme strange. Wee* Imitate smells, *making all* smells *to breath out of other* Mixtures *than those that give them. Wee make diverse* Imitations *of* Taste *likewise, so that they*

will

will deceive any Mans Taste. *And in this* House *we containe also a* Confiture-House; *where we make all* Sweet-Meats, Drie *and* Moist; *And divers pleasant* Wines, Milks, Broaths, *and* Sallets, *farre in greater Varietie than you have.*

We have also Engine-Houses, *where are prepared* Engines *and* Instruments *for all Sorts of* Motions. *There we imitate and practise to make* Swifter Motions, *than any you have, either out of your* Muskets, *or any* Engine *that you have: And to* Make *them, and* Multiply *them more* Easily, *and with* Small Force, *by* Wheeles, *and other* Meanes: *And to make them* Stronger, *and more* Violent, *than yours are; Exceeding your greatest* Cannons *and* Basilisks. *Wee represent also* Ordnance *and* Instruments *of* Warre, *and* Engines *of all Kindes: And likewise New* Mixtures *and* Compositions *of* Gunne-Powder, Wilde-Fires *burning in* VVater, *and* Unquenchable. *Also* Fire-workes *of all* Varietie *both for* Pleasure, *and* Vse. *Wee imitate also* Flights *of* Birds; *VVe have some* Degrees *of* Flying *in the* Ayre. *VVe have* Ships *and* Boats *for* Going *under* VVater, *and* Brooking *of* Seas; *Also* Swimming-Girdles *and* Supporters. *VVee have divers curious* Clocks; *And other like* Motions *of* Returne: *And some* Perpetuall Motions. *We imitate also* Motions *of* Living Creatures, *by* Images *of* Men, Beasts, Birds, Fishes, *and* Serpents; *We have also a great Number of other Various* Motions, *strange for* Equality, Fineness, *and* Subtilty.

We have also a Mathematicall-House, *where*

are

are represented all Instruments, *as well of* Geometry, *as* Astronomy, *exquisitely made.*

We have also Houses *of* Deceits *of the* Senses; *where we represent all manner of* Feats *of* Jugling, False Apparitions, Impostures, *and* Illusions; *And their* Fallacies. *And surely you will easily beleeve, that we, that have so many* Things *truely* Naturall, *which induce* Admiration, *could in a* World *of* Particulars *deceive the* Senses, *if wee would disguise those* Things, *and labour to make them seeme more* Miraculous. *But we doe hate all* Impostures, *and* Lies: *Insomuch as wee have severely forbidden it to all our* Fellowes, *under paine of Ignominy and Fines, that they doe not shew any* Naturall VVorke *or Thing,* Adorned *or* Swelling; *but onely* Pure *as it is, and without all* Affectation *of* Strangenesse.

These are (my Sonne) the riches of Salomons House.

For the severall Employments *and* Offices *of our* Fellowes; *We have Twelve that Sayle into* Forraine Countries *under the* Names *of other* Nations, (*for our owne we conceale*;) *Who bring us the* Bookes, *and* Abstracts, *and* Patternes *of* Experiments *of all other* Parts. *These we call* Merchants *of* Light.

Wee have Three that Collect *the* Experiments *which are in all* Bookes, *These we call* Depredators.

Wee have Three that Collect *the* Experiments *of all* Mechanicall Arts; *And also of*

Liberall Sciences; *And also of practises which are not* Brought into Arts. *These we call* Mystery-men.

We have three that trie New Experiments, *Such as themselves thinke good. These we call* Pioners *or* Miners.

We have Three that Draw *the* Experiments *of the* Former Foure *into* Titles, *and* Tables, *to give the better light for the drawing of* Observations *and* Axiomes *out of them. These wee call* Compilers.

Wee have Three that bend themselves, Looking *into the* Experiments *of their* Fellowes, *and cast about how to draw out of them* Things *of* Use, *and* Practise *for* Mans life, *and* Knowledge, *as well for* Workes *as for* Plaine Demonstration *of* Causes, Meanes *of* Naturall Divinations, *and the easie and cleare* Discoverie *of the* Vertues *and* Parts *of* Bodies. *These wee call* Dowry-men *or* Benefactors.

Then after diverse Meetings *and* Consults *of our whole* Number, *to consider of the former* Labours *and* Collections, *we have Three that take care, out of them to* Direct New Experiments, *of a Higher* Light, *more* Penetrating *into* Nature *than the* Former. *These we call* Lamps.

We have three others that doe Execute *the* Experiments *so* Directed, *and* Report *them. These we call* Inoculators.

Lastly, we have three that raise the former Discoveries *by* Experiments, *into* Greater Observations, Axiomes, *and* Aphorismes. *These wee call* Interpreters *of* Nature.

We have also, as you must thinke, Novices *and* Apprentices, *that the Succession of the former Employed Men doe not faile; Besides a great Number of* Servants *and* Attendants, Men *and* Women. *And this we doe also: Wee have* Consultations, *which of the* Inventions *and* Experiences, *which we have discovered, shall be Published, and which not: And take all an* Oath *of* Secrecie, *for the concealing of those which we thinke fit to keepe Secret: Though some of those we doe reveale sometimes to the* State, *and some not.*

For our Ordinances *and* Rites: *We have two very* Long, *and* Faire Galleries: *In one of these wee place* Patternes *and* Samples *of all manner of the more* Rare *and* Excellent Inventions: *In the other wee place the* Statua's *of all* Principall Inventours. *There we have the* Statua *of your* Columbus, *that discovered the* West-Indies: *Also the* Inventour *of* Shippes: *Your* Monke *that was the* Inventour *of* Ordnance, *and of* Gunpowder: *The* Inventour *of* Musicke: *The* Inventour *of* Letters: *The* Inventour *of* Printing: *The* Inventour *of* Observations *of* Astronomy: *The* Inventour *of* Works *in* Metall: *The* Inventour *of* Glasse: *The* Inventour *of* Silke *of the* Worme: *The* Inventour *of* Wine: *The* Inventour *of* Corne *and* Bread: *The* Inventour *of* Sugars: *And all these, by more certaine Tradition, than you have. Then have wee divers* Inventours *of our* Owne, *of* Excellent VVorkes; *Which since*

you have not seene, it were too long to make Descriptions *of them; And besides, in the right Understanding of those* Descriptions, *you might easily erre. For upon every* Invention *of Valew, we erect a* Statua *to the* Inventour, *and give him a Liberall and Honourable* Reward. *These* Statua's *are, some of* Brasse; *some of* Marble *and* Touchstone; *some of* Cedar *and other speciall* VVoods *gilt and adorned; some of* Iron; *some of* Silver; *some of* Gold.

Wee have certaine Hymnes *and* Services, *which we say daily, of* Laud *and* Thankes *to* God *for his Marveilous* Workes: *And* Formes *of* Prayers, *imploring his* Aide *and* Blessing, *for the* Illumination *of our* Labours; *and the turning of them into* Good *and* Holy Vses.

Lastly, we have Circuits *or* Visits, *of divers* Principall Cities *of the* Kingdome; *where as it commeth to passe, we doe publish such New* Profitable Inventions, *as wee thinke good. And we doe also declare* Naturall Divinations *of* Diseases, Plagues, Swarmes *of* Hurtfull Creatures, Scarcity, Tempests, Earthquakes, Great Inundations, Comets, Temperature *of the* Yeare, *and divers other Things; And wee give* Counsell *thereupon, what the* People *shall doe, for the* Prevention *and* Remedy *of them.*

And

And when He had ſaid this, Hee ſtood up: And I, as I had beene taught, kneeled downe; and he laid his Right Hand upon my Head, and ſaid; *GOD bleſſe thee my Sonne, and GOD bleſſe this Relation, which I have made. I give thee leave to Publiſh it, for the good of other Nations; For we here are in GODS Boſome, a Land unknowne.* And ſo he left me; Having aſſigned a valew of about two Thouſand Duckets, for a Bounty to me and my Fellowes. For they give great Largeſſes, where they come, upon all occaſions.

The reſt was not Perfected.

MAG-

MAGNALIA NATVRÆ
PRAECIPUE QUOAD *VSVS HVMANOS.*

THe Prolongation *of* Life.
The Restitution *of* Youth *in some* Degree.
The Retardation *of* Age.
The Curing *of* Diseases *counted* Incurable.
The Mitigation *of* Paine.
More Easie *and lesse* Loathsome Purgings.
The Encreasing *of* Strength *and* Activity.
The Encreasing *of* Ability *to suffer* Torture *or* Paine.
The Altering *of* Complexions: *and* Fatnesse, *and* Leannesse.
The Altering *of* Statures.
The Altering *of* Features.
The Encreasing *and* Exalting *of the* Intellectuall Parts.
Versions *of* Bodies *into other* Bodies.
Making *of* New Species.
Transplanting *of one* Species *into another.*
Instruments *of* Destruction, *as of* VVarre *and* Poison.

Exhilaration

Exhilaration *of the* Spirits, *and* Putting *them in good* Disposition.
Force *of the* Imagination, *either upon another* Body, *or upon the* Body *it selfe.*
Acceleration *of* Time *in* Maturations.
Acceleration *of* Time *in* Clarifications.
Acceleration *of* Putrefaction.
Acceleration *of* Decoction.
Acceleration *of* Germination.
Making Rich Composts *for the* Earth.
Impressions *of the* Aire, *and* Raising *of* Tempests.
Great Alteration; *As in* Induration, Emollition, &c.
Turning Crude *and* Watry Substances, *into* Oyly *and* Unctious Substances.
Drawing of New Foods *out of* Substances *not now in* Use.
Making New Threds *for* Apparell; *And* New Stuffes, *Such as are* Paper, Glasse, &c.
Naturall Divinations.
Deceptions *of the* Senses.
Greater Pleasures *of the* Senses.
Artificiall Mineralls *and* Cements.

FINIS.